# INDUSTRIAL DIAMOND ABSTRACTS

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## DIAMOND MINING AND INDUSTRY

**Alluvial diamond returns for April**

S African Mines Dept. *Diamond News* etc 1958 Vol 21 (10) pp 41-42 (July)

Rough and uncut diamond production in April 1958 for Cape Province : 3,224.00 ct of total value £38,610 (239s 6d per ct) ; Private Estates : 409.00 ct of total value £9,802 (479s 3d per ct) ; Transvaal Province : 13,612.25 ct of total value £37,944 (55s 9d per ct). Thus total production amounted to : 17,245.25 ct of total value £86,356 (79s 11d per ct).

*M* *C 1.21*

**Tanganyika diamond exports for May**

Tanganyika Dept Mines. *Diamond News* etc 1958 Vol 21 (10) p 35 (July)

Exports for May 1958 : 36,000 ct of total value £266,000 (147s 9d per ct). Total exports for Jan to May 1958 : 172,046 ct of total value £1,534,344 (178s 4d per ct). Corresponding exports for May 1957 : 19,520 ct of total value £157,383 (161s 3d per ct). Total exports for Jan to May 1957 : 107,045 ct of total value £1,050,804 (196s 4d per ct).

*M* *C 1.22*

**Reconnaissance for diamonds in West Ubangi**

G. Berthoumieux, F. Delany. *Gouvt gén Afrique Equator Franç, Bull direct mines & géol* 1957 (8) pp 77-85 ; *Chem Abstr* 1958 Vol 52 (10) col 7959 (May 25) (Original in French)

Placer deposits are briefly described, and heavy minerals associated with the diamonds, *eg* tourmaline, are mentioned. *W* *C 1.22*

**Natural abrasives**

Z. Kalix, J. Barrie. *Min Resour Aust Summ Rep* (Canberra) 1957 (41) 48 pp ; *IMM Abstr* 1958 Vol 8 (5) p 302 (June-July)

Australia produces diamonds from NSW which are mainly unsuitable for gems, being small, rounded, and coloured ; corundum comes from Queensland, emery from NSW and W Australia, garnet as a by-product of rutile-zircon comes from Queensland and NSW, and siliceous abrasives. With the exception of siliceous abrasives, however, Australia is dependent on imports.

*X* *C 1.26 : D 14.1*

**What will be exhibited.** Ce qui sera exposé

Anon. *Machine Mod* 1958 Vol 52 (593) pp 19-66 (Aug) (In French)

At the Mécanélec exhibition, a wide selection of grinding, truing, lapping, cutting off, sharpening, centreless grinding, cylindrical grinding, and milling devices will be shown. The firm of Malicet & Blin will show an internal grinding machine, type RI-2-28, with hydraulic control, which has been specially designed for the mass production of pieces on which the machining covers a surface within the limits of 10 to 50 mm in diameter. It has a Size-matic diamond calibration apparatus, and a rigid diamond holder with micrometric control ensures that the desired outline is followed exactly.

The firm of Constructions de Clichy will show a standard type of grinding machine with automatically controlled diamond. The diamond truing apparatus can be incorporated in either the tailstock, or, independently of the table, behind the tailstock.

Etablissements Thomasset have manufactured a Royal machine for grinding carbide tools with a diamond wheel, which will be shown by the Société R. S. Stockvis & Fils. It is a simple machine with a relatively small wheel.

A machine for truing flat surfaces, made by Ets Maegerlé, will be shown on the same stand. It has a hydraulically controlled diamond truing attachment, which will give to the wheel the shape required for truing the slide rails of turret lathes. 154 illustr.

*A* *C 5.21 : C 5.3 : C 6.0 : C 13.2*

**Diamonds in stone meteorites**

H. C. Urey & coll (Chicago Univ). *Geochim & Cosmochim Acta* 1957 Vol 13 pp 1-4 ; *Chem Abstr* 1958 Vol 52 (8) col 6069 (Apr 25)

A search for diamonds was carried out in chondritic stone meteorites. The powdered meteorite samples were decomposed by prolonged treatment with ($HNO_3$ + HCl) and ($H_2SO_4$ + HF), followed by fusion of the residue with NaOH. The final acid-insoluble residues were subjected to x-ray diffraction analysis. A control sample of diamonds put through the same procedure was recovered completely. Only the Goalpara meteorite — a Ureilite — contained diamond, 0.3%, mixed with graphite. Size of the ultimate diamond crystals was established as $\sim$ 100 AU.

*W* *C 1.25*

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**Diamonds—USSR**

Anon. *Min Trade Notes* 1958 Vol 46 (6) pp 32-34 (June)

Some of the published information on the Russian diamond fields is briefly reviewed. The first industrial diamonds from the Yakutsk arrived in Moscow for cutting at the end of 1956. Some of the Yakutsk fields are reported to be richer than the Belgian Congo, and it is claimed that the stones are of a better quality. The recent activity is believed to have been to the west of the loop formed by the Lena River in the vicinity of Yakutsk. The six diamondiferous areas are identified. Two of the areas are particularly promising, while the other four are less so. The joint percentage of good industrials and gems is 19.24%, and the conclusion is drawn that 80.76% is boart. Extensive deposits have been found near Sverdlovsk, and others in the Upper Aldan basin. Soviet diamond requirements are estimated at 3 to 4 million ct/year.

*W* *C 1.24*

**Gemstones—India**

Anon. *Min Trade Notes* 1958 Vol 47 (2) p 24 (Aug)

Diamond production in India during 1957 amounted to 790 carats. This compares with 1,499 ct for 1956 and 1,787 ct for 1955. *W* *C 1.24*

**Diamonds—Angola**

Anon. *Min Trade Notes* 1958 Vol 47 (2) p 24 (Aug)

A diamond cutting and processing industry is to be established in Lisbon to treat Angola's annual production of about 445,000 carats.

*W* *C 1.5*

**Those Siberian diamonds**

Anon. *SA Min & Engg Journ* 1958 Vol 69 (3406) p 867 (May 23)

The article infers that too much importance might easily be attached to the effect which synthetic and Russian diamonds will have on the diamond market.

*W* *C 1.24*

**Diamonds—Venezuela**

Anon. *Min Trade Notes* 1958 Vol 47 (1) p 29 (July)

Production of diamonds totalled 122,598 carats in 1957, compared with 93,834 carats in 1956, an increase of 31 per cent. 1 table. *W* *C 1.24*

**How they looked for Africa in Siberia**

I. Adabashau. *Belarus'* 1958 Vol 15 (3) p 26 (Mar); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 1270 (July) (Original in Russian)

*X* *C 1.24*

**Exploration and development of mineral resources in French Equatorial Africa**

J. C. Arundale. *Min Trade Notes* 1958 Vol 46 (6) Special Supplement No 54 8 pp (June)

It is stated that Pacific Tin and the Compagnie Minière de l'Oubangui Oriental are developing a diamond deposit in W Oubangui.

*W* *C 1.24*

**TRADE LITERATURE HOLDINGS**

**Readers are requested to note that trade literature reviewed in this journal is not available for loan, nor is it displayed in the Information Bureau's Library. Readers wishing to obtain copies of the catalogues are requested to apply to the address which appears immediately under the title of the review.**

**Nature of the kimberlitic pipes of Yakutia**

L. N. Leont'ev, A. K. Kadenskii. *Doklady Akad Nauk SSSR* 1957 Vol 115 pp 368-371; *Chem Abstr* 1958 Vol 52 (7) col 5228 (Apr) (Original in Russian)

*W* *C 1.24*

**Earthmoving in the diamond mines of Southern Africa**

C. P. A. Louwrens. *SA Inst Min & Met Journ* 1958 Vol 58 (11) pp 563-587 (June)

The amounts of earth removed from the diamond mines in Southern Africa are given, together with an indication of the extent of the reduction required to produce diamonds. The earthmoving methods at the Consolidated Diamond Mines of South-West Africa Ltd, using modern equipment and methods, are described in some detail. Statistics and costs, which are given for production and maintenance, are derived from figures compiled over a number of years, during which millions of tons were handled. 21 illustr, 1 table, 3 appendices. *W* *C 1.3*

**Indications of bauxite in the federal territory of Amapa, Brazil**

L. J. de Moraes. *Engen Minerac Metal* (Rio de Janeiro) 1957 Vol 26 pp 293-294 (Nov); *IMM Abstr* 1958 Vol 8 (5) p 296 (June-July) (Original in French)

The author discusses the occurrence of bauxite in laterites, and mentions other minerals found in the area. These include Mn, Fe, Cr, Au, diamond, cassiterite, heavy minerals, ceramic clays, and lignite.

*X* *C 1.24*

**Basic geological features of the diamond province of Siberia**

M. M. Odintsov. *Izv vost fil AN SSSR* 1957 (1) pp 27-34; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 1228 (July) (Original in Russian)

*X* *C 1.24*

**Diamond resources of British Guiana**

E. R. Pollard, C. G. Dixon, R. A. Dujardin. *Brit Guiana Geol Survey Bull* 1957 No 28 pp 1-45; *Chem Abstr* 1958 Vol 52 (10) col 7959 (May 25); See *Ind Diamond Abstr* 1958 Vol 15 p A (Sep)

*W* *C 1.23*

**Russian diamonds**

A. J. Steiger. *Gemmologist* 1958 Vol 27 (323) pp 108-110 (June)

Information available on recent Russian diamond finds is briefly presented. Situated in the Siberian platform, the diamondiferous area extends over 1,000 miles, from Krasnoyarsk to Yakutsk. Finds include 40 kimberlite pipes and scores of alluvial beds. The history of the Russian search for diamonds is summarized. An automatic device which uses x-rays in diamond separation is being installed at the Yakutsk diamond mining works. 1 illustr.

*W* *C 1.24*

**Some regularities in the paragenetic connections between the pyropes and diamonds**

L. N. Zveder. *Izvest Vost Fil Akad Nauk SSSR* 1957 No 7 pp 22-25; *Chem Abstr* 1958 Vol 52 (12) col 9876 (June 25) (Original in Russian)

Based upon the analyses for $SiO_2$, $Al_2O_3$, $Fe_2O_3$, FeO, CaO, MgO, and $Cr_2O_3$ of the pyropes and breccia of the Kimberley and Siberian diamond deposits, it is shown that the pyropes are paragenetic with diamond. Shafts of kimberlite where the breccia does not contain bloody-red and lilac coloured pyropes, will not contain diamonds. *W* *C 1.0 : C 2.7*

**South African mining in 1957**

L. A. Waspe. *Mining Mag* 1958 Vol 98 (4) pp 206-213 (Apr)

A survey of the year's activities includes a section on diamond production. Output and caratage sold declined during the year. The company exploiting a Kimberlite fissure in the Rustenburg area, which has a high industrial diamond content, expects difficult underground conditions to continue. 3 illustr.

*W* *C 1.21*

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## PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF DIAMOND AND OTHER HARD MATERIALS

**The heat capacity of diamond between 12.8° and 277° K**

J. E. Desnoyers, J. A. Morrison. *Phil Mag* 1958 Vol 3 (25) pp 42-48 (Jan)

The heat capacity of diamond was measured in the temperature range of 12.8 to 277 deg K, with estimated accuracies of ±20% at 13 deg K, ±6% at 20 deg K, ±0.8% at 100 deg K, and ±0.2% for T>200 deg K. Fitting of the results in the region $T<\Theta_D/20$ to the low temperature expansion for the heat capacity gave $\Theta_s$ = 2219 ±20 deg K, which agrees well with $\Theta$ (elastic) = 2240 ±5 deg K, derived from elastic constants determined by H. J. McSkimin and W. L. Bond. Down to 75 deg K, the results are in reasonable agreement with earlier measurements of W. De Sorbo, but, at lower temperatures, an anomaly reported by De Sorbo was not confirmed. 2 illustr, 15 ref, 2 tables.

*W* *C 2.28*

**The fluorescence of diamond**

H. B. Dyer, I. G. Matthews (Phys Res Lab, Reading Univ). *Roy Soc Proc A* 1958 Vol 243 (1234) pp 320-335 (Jan 14)

Apparatus is described which was developed for recording the fluorescence of diamond both photographically and photoelectrically. The 3650 AU group of mercury lines was found to excite fluorescence in all type I and type IIa diamonds examined, but type IIb diamonds gave no emission at that wavelength. The fluorescence spectra usually contained one or more 'systems' of lines, each system consisting of a main line accompanied by a banded ancillary structure. The systems are described and compared with features found in absorption spectra.

Excitation spectra obtained for the two common fluorescence systems are compared with absorption spectra, and the effect of irradiation (electron, neutron, and γ-ray) and subsequent heat treatment on the fluorescence spectrum is described.

Conclusions as to the nature of the centres responsible for the fluorescence are drawn from the results. 7 illustr, 16 ref, 7 tables. *W* *C 2.24*

**Progress in crystallography in USSR in the last 40 years**

Anon. *Kristallografiya* 1957 Vol 2 (5) p 577; *DSIR Transl Contents Lists Russ Period* 1958 (114) p 65 (Sep) (Original in Russian)

*X* *C 2.5*

**Theory of light**

Anon. *The Loupe* 1958 Vol 8 (3) pp 2-4 (May-June)

It is mentioned that light travelling at 186,000 miles/sec will be reduced to a speed of approximately 77,000 miles/sec in a diamond. 12 illustr.

*W* *C 2.26*

**The polarization of luminescence in diamond**

R. J. Elliott, I. G. Matthews, E. W. J. Mitchell (Phys Res Lab, Reading Univ). *Phil Mag* 1956 Vol 3 (28) pp 360-369 (Apr)

It is shown that the polarization of luminescence from a cubic crystal, when excited by plane polarized light, may be used to determine the symmetry axes of the luminescent centres. This information is most readily obtained from a specimen which is bounded by (100) faces, and by using light travelling normally to the faces. Experiments on a diamond cut in this way, bounded, within 2°, by (100) faces, are described. The results are for the green luminescence from centres induced by heat treatment after irradiation. These centres appear to have symmetry axes along ⟨110⟩ directions. 6 illustr, 3 ref, 1 table.

*W* *C 2.24*

**The electronic structure of diamond, silicon and germanium**

C. G. Hall (Dept Maths, Imp Coll). *Phil Mag* 1958 Vol 3 (29) pp 429-439 (May)

The equivalent orbital method of describing the electronic structure of valence crystals, previously introduced by the author, is extended in various ways. The interactions of more distant bonds are now included, so that a more detailed description of the electronic structure can be given. The role of the equations as interpolation formulae is illustrated, and used to deduce the effective masses of holes for diamond, silicon, and germanium. The application of the method to the conduction bands is also considered. 7 ref, 3 tables. *W* *C 2.5*

**Interference-phenomena with Compton scattering**

N. Norman (Brooklyn Polytechn Inst). *Acta Cryst* 1958 Vol 11 (1) pp 1-4 (Jan 10)

By use of a filter technique, it is shown that the excellent divergent-beam patterns produced by some diamonds, even when irradiated with a parallel beam of x-rays, are caused by Compton radiation from atoms in the crystal. Only mosaic-type diamonds give such lines on the photographic film. It is suggested that the formation of the lines is principally due to secondary extinction, the Compton radiation being weakened and reinforced through reflexions from the lattice planes. 5 illustr, 8 ref. *W* *C 2.4 : C 2.5*

**On the occurrence of slip in diamond**

S. Tolansky, A. Halperin, S. H. Emara (Royal Holloway Coll). *Phil Mag* 1958 Vol 3 (31) pp 675-679 (July)

Linear discontinuities strictly in (1, 1, 1) planes have been observed on the natural octahedral faces of a diamond. The lines are studied optically. The characteristics of the lines suggest that they originate in slip which could have occurred while the diamond was growing and still hot. Three other possibilities, *ie* cracks, twinning, and stacking fault surfaces, are considered and rejected, and the slip hypothesis is found to be the only reasonable one which would account for the observed characteristics of the lines. 9 ref.

*W* *C 2.51*

**Czechoslovakian contributions in the field of manufacture of technical monocrystals and the study of their properties**

J. Kaspar. *Doklady Soveshchaniya* 1956 pp 32-38; *Chem Abstr* 1957 Vol 52 (6) col 4280 (Mar 25) (Original in Russian)

A brief history and description of the P. Ruzicka apparatus for determining the optimum orientation of the crystal lattice during the setting up of industrial diamonds, and a review of the manufacture of piezo-electric and optical crystals.

*W* *C 13.0*

**The diffraction of x-rays by diamond. I & II**

C. V. Raman. *Indian Acad Sci Proc A* 1958 Vol 47 (5) pp 263-275 (May); (6) pp 335-343 (June)

In the first part, the theory of x-ray diffraction in crystals is discussed, and it is shown that the production of x-ray reflexions is equally a result of the presence of nuclei as of the presence of the electrons. It is also shown that the passage of x-rays through a crystal, and their reflexion by the stratifications of electron density, can simultaneously result in vibrational energy transitions, provided that the modes of vibration thus excited involve displacements of electric charge and are therefore active as absorbers of infra-red radiation. Vibrational modes of this kind, when excited, result in periodic displacements of the stratifications of electron density. Consequently, reflexions appear whose frequencies are less (or greater, as the case may be) than the frequency of the incident x-radiation. It is explained why it is possible for such reflexions to appear even when the setting of the crystal is different from that required for the usual or unmodified reflexions. The geometry of the x-ray reflexions which then appear in displaced positions is also discussed.

In the second part, it is concluded that there are two possible states of the carbon atom, *ie* dextro and laevo. Further conclusions on the electronic structure of a homogeneous diamond relate to the effect of electronic symmetry on x-ray excitation. 5 illustr.

*W* *C 2.4*

**A-bomb diamonds ?**

Anon. *Swiss Watch & Jewelry Journ* 1958 (3) p 302 (May-June)

The heat and pressure generated by an underground atomic bomb explosion may be sufficient to turn carbon into diamonds, according to an article in the New York Times. *A* *C 2.6*

**X-ray camera (KRON-1) for the investigation of cut and uncut crystals**

V. A. Frank-Kamenetskii & coll. *Kristallographiya* 1956 pp 468-471; *Chem Abstr* 1958 Vol 52 (7) col 5117 (Apr 10) (Original in Russian)

Description of goniometer.

*W* *D 15.7*

**Crystal synthesis**

N. N. Sheftal'. *Nauka i zhizn* 1958 Vol 25 (3) pp 59-64 (Mar); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 1102 (July) (Original in Russian)

*X* *C 2.6*

**Machinable cemented [sintered] carbide**

Sintercast Corp of America, 134 Woodworth Avenue, Yonkers 2, NY. *Machinery Lloyd* 1958 Vol 30 (18A) p 66 (Sep 6)

Ferro-Tic is a new form of sintered carbide produced by powder technology techniques. It is reported to be easily machinable. *W* *C 12.0*

**A method for measuring the thermal constants of granular materials.** Eine Methode zur Messung der thermischen Konstanten koerniger Stoffe

T. S. E. Thomas. *Brit Journ Appl Phys* 1957 Vol 8 (10) pp 403-405; *Staub* 1958 Vol 18 (9) p 285 (Sep) (In German, original in English)

The method described employs small quantities of material and allows the determination of the specific heat as well as that of the coefficient of heat conductivity. It can be applied in modified form to the measurement of thermal constants of easily worked, rigid, non-granular substances such as plastic, as well as to that of granular materials.

*A* *C 2.28*

**Brittle materials**

W. H. Walton. *Times Sci Rev* 1958 (29) pp 6, 8 (Autumn)

A general article which, in passing, refers to diamond as having high resistance to wear as a cutting and grinding medium, whilst being prone to chipping and brittle fracture under shock forces. Curves are shown which illustrate the relationship between ultimate elongation, Brinell hardness, yield point stress, maximum stress, and notch impact strength for nickel-chromium steel. 4 illustr. *W* *C 2.22*

**A note on the formation of etch pits on crystals**

M. Yamamoto. *Tohoku Univ Res Inst Sci Rep* 1958 Vol 10 (1) pp 1-10 (Feb)

It is shown that an etch pit on a crystal can originate from either an easily soluble small inclusion on the crystal surface, or from a dislocation in the crystal. The article includes a theoretical consideration and experimental evidence of the multiplicated etch pit as a variation of the dislocation etch pit. 13 illustr, 8 ref.

*W* *C 2.5*

## DIAMOND IN INSTRUMENTS, ETC

**A link with Fabergé**

Anon. *Watchmaker* etc 1958 pp 74-75 (Jan)

A short review of works by Alfred Pocock. One of his diamond tools used for engraving is in the form of a fish—the diamond cutting point being set in the mouth of the fish. 5 illustr. *W* *C 10.2*

**Investigations of the operational characteristics of pivot and jewel bearings**

E. Fischer. *Wiss Z Tech Hochsch Dresden* 1956-1957 Vol 6 (6) pp 1215-1226; *Sci-Abstr* 1958 Vol 61B (725) p 242; *BSIRA Bull* 1958 Vol 13 (7) p 186 (July) (Original in German)

The bearings investigated were of the vertical-axis, watthour-meter type, *ie* radiused steel pivot and a cupped jewel. *X* *D 10.0*

**BP 2,827,038** **G. Lefevre, Mo Na Cor**

(Nov 2, 1955—conv date, France)

**Boring machine adapted more particularly for the use in the boring of small hard stones serving for industrial purposes such as clockwork jewels or draw-plates**

A number of vertical drill spindles are mounted around a turret rotatably mounted on a base, with an electric motor controlling the rotation of the turret. Each spindle is operating over a stone-carrying block to be set in alignment with the spindle and urged by a rocking member into the drilling position. On completion of the hole, the rocking member collapses and the stone is discharged. The machine is electrically controlled and the operations follow each other automatically. The drills are hydraulically rotated at a rate of 30,000 to 100,000 rev/minute. One operator may control, *eg* five machines, arranged in arcuate formation, as the operator has only to change the drills when worn. (10 claims, 27 illustr). Ref cited: 3 USP.

*J* *D 10.6*

## HARDNESS AND WEAR TESTING

**Investigation of the anisotropy of hardness of mono-crystals of PbS by means of abrasion**

Yu. S. Boyarskaya. *Kristallografiya* 1957 Vol 2 (5) p 709; *DSIR Transl Contents Lists Russ Period* 1958 (114) p 67 (Sep) (Original in Russian)

*X* *C 4.0*

**Tests for and engineering properties of ceramic tile**

J. V. Fitzgerald, E. L. Kastenbein. *ASTM Bull* 1958 (231) pp 74-80 (July)

A number of tests are described which are commonly used in evaluating the properties of ceramic tile. The latest abrasive hardness test uses the Taber abrasion tester [see *Bibl Ind Diamond Appl* 1957 Vol 14 p B62 (Apr)]. Hardness tests are made with the Tukon microhardness tester. Unglazed surfaces should be polished before hardness testing in order to render the diamond impression clearly visible for reading. The Bierbaum Microcharacter instrument is employed for scratch testing. In this test, the edge of a polished diamond is drawn across the specimen at a constant rate and load; the width of the scratch thus formed is a measure of the material's susceptibility to scratch. 3 illustr, 11 ref, 15 tables.

*W* *C 4.0 : C 8.72*

**Burton Mark 3 portable hardness tester**

W. O. Bullock & Sons Ltd, Swindon. *Machinery* (London) 1958 Vol 93 (2391) p 614 (Sep 10)

The manually applied hardness tester uses a diamond indenter to perform tests to a maximum depth of 0.005 inch. A large-scale indicator shows the hardness reading on Vickers, Brinell, and Rockwell scales. Several types are available. 1 illustr.

*W* *C 4.2*

**Microhardness of aluminum boride monocrystals**

P. G. Cotter (Bureau of Mines, Norris, Tennessee). *Am Mineralogist* 1958 Vol 43 (7/8) pp 781-784 (July-Aug)

Several types of aluminium boride monocrystals were tested on a Tukon microhardness tester equipped with a Knoop indenter. The hardness of yellow aluminium boride mono-crystals was ≈ 2700 at a load of 100 g, *ie* harder than silicon carbide. Samples were prepared for hardness tests by being mounted in bakelite and ground with a 600 mesh diamond wheel. Polishing with a 1,000 mesh diamond wheel, and a final polishing with 0.2 micron diamond powder, provided a suitable surface for the tests. 4 illustr, 2 ref, 1 table.

*W* *C 4.32 : C 12.61*

**Systems for the plastic shaping of metals. II.** Systematik der bildsamen Formung von Metallen—II Teil

W. Engelhardt. *Fertigungstechnik* 1958 Vol 8 (9) pp 418-422 (Sep) (In German)

The discussion of pressing, bending, and cutting is preceded by a short paragraph on hardness testing, in which Brinell, Rockwell, Vickers, and Ludwik processes are mentioned. *A* *C 4.3 : C 12.6*

**Connection between micro- and macrohardness of metals**

V. D. Lisitsyn. *Zav Lab* 1958 Vol 24 (4) pp 467-470; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 1138 (July) (Original in Russian)

*X* *C 4.31 : C 4.32*

**Scratch hardness. I. Relation to cold-working**

T. Sutoki, T. Hikage. *Tohoku Univ Res Inst Sci Rep* 1958 Vol 10 (2) pp 85-96 (Apr)

Specimens of single crystals and polycrystals of aluminium (99.99%), electrolytic copper (99.9%), cast iron (99.4%), distilled magnesium (99.99%), and electrolytic zinc were polished electrolytically. The Martens' scratch hardness, using a conical diamond point, was measured at loads from 3 to 100 g. The micro-indentation hardness was determined with a special apparatus. The relation of indentation test results to scratch test results is discussed. It is concluded that scratch hardness, contrary to G. Tammann, is related to the annealed state of a metal, rather than to the severely hardened state. 16 illustr, 11 ref, 2 tables. *W* *C 4.0*

**A simple apparatus for studying the wear of tungsten carbide**

J. Golden, G. W. Rowe (Tube Investments Res Labs, Cambridge). *Wear* 1958 Vol 1 (6) pp 491-498 (June)

This paper describes a simple apparatus which has been used for experiments on the transfer of radioactive tungsten carbide to steel and copper during moderate speed sliding under various conditions. A flat plate of metal 6 in. in diameter is roated beneath a small tungsten carbide slider which carries loads up to 4 kg and moves radially inwards. The resulting wear track forms a close spiral about twenty feet long. A great advantage of the method is that zones of the metal plate can be treated differently, and the effects on transfer of the active slider can be studied in detail from autoradiographs. It is found that the wear rate adjusts very rapidly (within a few milli-seconds) to a change in the plate surface. 3 illustr, 5 ref.

*X* *C 2.23*

**Wear of cutting tools**

V. M. Gorelov. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 950 (July) (Original in Russian)

Book, Izd 3-e, Gos nauchno-tekhn izd-vo mashinostroit lit-ry, Moscow. 1957, 26 pp. [Not in library of Ind Diamond Inf Bur]. *X* *C 2.23*

**On the sintering of [a] porcelain body and the variation hardness within it**

C. Kawashima, Y. Murata. *Jap Ceram Assoc Journ* 1957 Vol 65 (743) pp 281-289 (Nov) (In Japanese, abstr in English)

10 illustr, 21 refs, 3 tables. *W* *C 2.6*

**Testing machines and apparatus for metallic materials.** Pruefmaschinen und Pruefeinrichtungen fuer Metallische Werkstoffe

H. Mintrop. *VDI-Zeits* 1958 Vol 100 (25) pp 1237-1240 (Sep 1) (In German)

A variety of testing machines, including hardness testers, is described. The hardness testers are Brinell, Rockwell, and Vickers models. The Knoop and Grodzinski tests are recommended for microhardness testing with low loads. 8 illustr, 23 ref.

*A* *C 4.0*

**On the mechanism of wear between metal surfaces**

G. Yoshimoto, T. Tsukizoe. *Wear* 1957/58 Vol 1 (6) pp 472-490 (June)

The analysis of the mechanism of wear between metal surfaces is dependent on the distribution of the real area of contact, *ie* the mechanism of contact. Assuming a simple model which represents the profile curve of the metal surface, the number and size of the individual areas of contact can be deduced theoretically. Considering three types of wear for steel or cast iron (mechanical wear, $Fe_2O_3$ film wear, and $Fe_3O_4$ film wear), the theoretical wear rate concerning each type of wear can also be deduced. In general, one of the three types of wear does not occur individually, but two or three types occur together. Moreover, the combination of three types of wear may be dependent on the velocity of sliding and the load between the surfaces. From this relationship between the mechanism of wear and the velocity or the load, the complicated variation of the actual wear rate with velocity or load is discussed theoretically. 11 illustr, 13 ref, 1 table.

*X* *C 2.23*

**LITERATURE REQUESTS**

**When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.**

**A new Wolpert low load hardness tester.** Ein neuer Wolpert-Kleinlasthaertepruefer

L. Schimmer. *Von Werkzeugen und Werkzeugmaschinen* 1958 (14) pp 24-25 (In German)

A new Vickers hardness tester, the V-Testor, will perform tests on small parts and within cavities, with a load of 250 to 10,000 grammes. Various testing heads can be attached, including diamond. 1 illustr.

*A* *C 4.0*

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## TRUING OF GRINDING WHEELS

**The dressing and truing of grinding wheels.** Das Schaerfen und Abrichten von Schleifscheiben

Anon. *Technica* 1958 Vol 7 (17) pp 949-954, 983-987 (Aug 15) (In German)

In the grinding method of dressing, the individual sharp crystals in the grinding wheel remove chips from the workpiece surface, and the coolant, helped by the centrifugal force of the turning wheel, washes the chips away when they lodge between the grains. Some wheels wear down quickly, but a well-chosen wheel will not glaze, the edges of the crystals remaining sharp, thus saving down time and diamond wear. The hardness of a wheel is determined by the resistance of the bonding material to penetration by chips, as well as by the hardness of the actual abrasive. If the bond is too hard, the grains wear down to the level of the bond and tend to press rather than cut. Too soft a wheel cuts very cleanly, but wears down too quickly. The truing of a wheel can be done with or without diamond. If diamond is not used, coarse mesh silicon carbide is suitable and will remove the bond between the crystals to form a good sharp grinding surface. Ceramic dressing devices and steel wheels can also be used. The step method of truing is particularly suitable for obtaining a high quality fine finish, and consists of two separate processes, the first using a steel wheel and the second a diamond tool. Instructions are provided for the actual working process, and users of sintered carbide truing tools are warned that a sudden flow of coolant on to a hot tool will cause breakage or cracking. The use of a profile milling cutter and the profiling of a thread grinding wheel are discussed. The article concludes with general rules for profiling grinding wheels. 25 illustr, 1 table. (To be cont).

*A* *C 5.0 : C 5.21*

**Radius dressing made easy**

P. Kolb, Chicago, Ill. *Am Machinist* 1958 Vol 102 (8) p 170 (Apr 21)

A special radius truing device was devised in order to overcome difficulties encountered in a grinding operation on convex and concave forms. Regular truing of the grinding wheel was necessary, and this was simplified by the use of the new tool. The truer features a vernier height gauge which controls a diamond tool; radii from 0 to 3/16 in., concave or convex, can be formed. The diamond is a standard one, set at 90° by a headless setscrew. 1 illustr.

*W* *C 5.21*

**Diamond dressers accurately true up honing stones**

Staple Engg Co, 1315 South Woodward Ave, Birmingham, Mich. *Grinding & Finishing* 1958 Vol 4 (4) p 51 (Aug)

Tru-Hone diamond truers are suitable for truing most types of honing tools. The truers are metal-bonded, and the truing operation is reported to take only a few seconds. 1 illustr. *W* *C 5.21*

**Semi-automatic set-up for the complex (complete) double-profile truing of gears**

L. M. Semenova & coll. *Stanki i Instr* 1958 Vol 29 (7) pp 23-24 (In Russian)

2 illustr. *X* *C 5.21*

**USP 2,826,008** (June 29, 1956) **E. R. Dunn, Gardner Machine Co**

**Locating abrasive wheels for dressing**

In double disk grinders, the disks are spaced to grind a workpiece to a predetermined thickness, length, or width. For semi-automatic truing, the discs are to be shifted towards, and equal to the spacing of, two oppositely arranged truing diamonds, and then shifted to the proper spacing for grinding. An electrically controlled hydraulically operated device effects these movements between adjustable stops, compensating for wear and truing, and further effects the movement of the truing diamonds into, and out of, the space between the disks, and resets the disks in proper spaced relation to a predetermined size. (7 claims, 2 illustr). Ref cited : 3 USP ; 1 BP.

*J* *C 5.21*

**USP 2,826,188** (Jan 16, 1953) **S. G. Brady, Gear Grinding Machine Co**

**Trimming mechanism for form grinders**

The truing of a profiled grinding wheel may lead to inaccuracies when using a diamond with a cutting edge instead of a cutting point. The mechanism is intended to make the accuracy independent of the extension of the cutting edge, and also to distribute wear along the edge so as to maintain the form. The diamond cutting edge is of arcuate form and concentric with a point on the diamond carrier mechanism which traverses the exact contour desired. During truing, the diamond is oscillated about this point, *ie* the centre of its arcuate cutting edge. A pantograph mechanism is used, and one of the pivots is the centre of the arcuate cutting edge. (7 claims, 6 illustr). Ref cited : 8 USP ; 1 BP.

*J* *C 5.21*

**USP 2,826,189** (July 27, 1956) **S. Kirzner, H. A. Alpern**

**Dressing tool holder**

Quick adjustment of the truing tool to the level of the grinding wheel over a wide range is made possible by a tool holder in the form of a triangular frame with two flat surfaces at right angles to one another, and an oblique leg along which a block is slidable. The frame 14 (Fig 1) is placed on magnetic work table 10, and block 18, with diamond holder 21, is adjusted along leg 15. Block 18 may be turned round so that the diamond

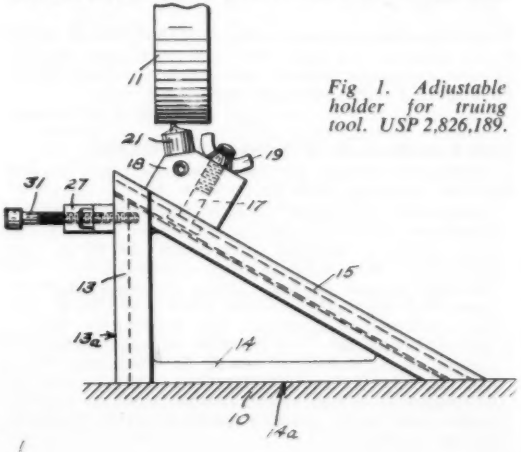


*Fig 1. Adjustable holder for truing tool. USP 2,826,189.*

is positioned to true the side faces of wheel 11. It may also carry two diamonds at right angles to one another. (5 claims, 7 illustr). Ref. cited : 2 USP.
*J* *C 5.21*

**BP 2,827,037** (Dec 13, 1954) **D. J. Wallace, I. Catallo, Wheel Trueing Tool Co**

**Form dressing assembly**

A truing tool is used which has its axis parallel to that of the wheel, and a segmental peripheral contour opposite to that which is to be imparted to the grinding wheel, and which is the same as that which is to be imparted to the final workpiece. This tool is angularly oscillated about its axis in contact with the periphery of the rotating wheel. The face of the truing tool is impregnated with diamonds of 400 mesh size. (6 claims, 2 illustr). Ref cited : 6 USP.
*J* *C 5.21*

## FINE BORING AND FINE TURNING OF METALS

**The chip producing methods of machining titanium and its alloys.** Die spanende Bearbeitung von Titan und seinen Legierungen

K. F. Meyer. *Ind-Anzeig* 1958 Vol 80 (71) pp 1091-1094 (Sep 5) (In German)

Particular difficulties are encountered in machining titanium because of its tendency to strain-hardening, and its chemical sensitivity to hydrogen, carbon, nitrogen, and oxygen at high temperatures. Compared with steel, it produces a very high temperature when in contact with a tool, and it is a poor conductor of heat. The differences in cutting speed and general machining conditions which these qualities make necessary, and the results obtained with the use of different types of sintered carbide cutting tools are discussed. It is concluded that in comparison with structural steel, titanium and its alloys of the same Brinell hardness require something like a third of the cutting speed at which steel can be machined. 11 illustr, 4 ref, 1 table.
*A* *C 12.6*

**Ceramic turning tools of today.** Keramik-Drehwerkzeuge heute

K. R. Pawlowitz. *Technik & Betrieb* 1958 Vol 10 (8) pp 121-122 (Aug) (In German)

The majority of ceramic tools consist of aluminium oxide, and the firm of Georg Fischer AG, Schaffhausen, has found that good results are obtained with a sintered material of 99.8% aluminium oxide. This substance has only a third of the pliability of sintered carbide, and only a third of its heat conductivity. Cutting angles are different from those required by sintered carbide tools, and performance is such that where a sintered carbide tool takes 3.3 minutes to sharpen a workpiece, one of ceramic takes 0.39 minutes. 3 illustr, 1 table. *A* *C 6.23 : C 8.72*

**Throwaway inserts for cutting tools.** Les plaquettes non récupérables pour outils coupants

Anon. *La Machine Mod* 1958 Vol 52 (594) pp 9-19 (Sep) (In French)

These are thin disks of sintered carbide or ceramic which can be indexed and reversed in their socket so as to present a constantly sharp cutting edge. Growing ever more popular in the USA, Britain, and Sweden, they are cheaper to replace than to re-sharpen after use, and, being very easy to change when this becomes necessary, they reduce machine down time. Information is given on methods of use. 27 illustr.
*A* *C 6.22*

**Cooling and lubrication of cutting tools.** Refroidissement et lubrification des outils de coupe

Anon. *L'Usine Belge* 1958 Vol 35 (1592) pp 6-8 (Aug 23) (In French)

The purpose of lubrication is to moisten the cutting surfaces of the tool so as to reduce wear. Steel and carbide surfaces have been found to have a coefficient of maximum friction between 650 and 900 deg C, which leads to partial fusion of the metals. Towards a temperature of 1,300 deg C, at very high cutting speeds, chemical reactions have been observed with tungsten carbide. The advantages of oil and aqueous coolants for different materials and methods, and the addition of substances such as phosphorus, chlorides, and sulphurs, and the use of gases and emulsions are discussed. *A* *C 6.2 : D 14.2*

**Ceramic cutting tools—a progress report**

G. W. Barnes (Norton Co). *Grits & Grinds* 1957 Vol 48 (11) pp 3-8 (Nov)

Improvements in wear resistance and tool life from new ceramics are reported, and ceramic tool evaluation tests are described. 3 illustr.
*W* *C 6.23*

**Nomograph for machine cutting time**

W. O. Becker (Mergenthaler Linotype Co, Brooklyn, NY). *Tooling & Prodn* 1958 Vol 24 (5) pp 43-44 (Aug)

The nomograph is particularly useful where different feeds and speeds are to be compared for turning, milling, and drilling operations.
*W* *C 6.0*

**The solution of difficult problems by an original tool set-up.** La solution de problèmes ardus par un outillage original

F. P. Brown, C. E. Pelander. *La Machine Mod* 1958 Vol 52 (594) pp 34-38 (Sep) (In French)

The article concerns apparatus for turning cones with a wide angle, sharpening tools on a vertical milling machine, and shaping with a revolving cutter. The latter is used for shaping conical pieces with thin edges, and the operation entails the use of a domed diamond-trued wheel with a diameter of 152 mm. 9 illustr.
*A* *C 5.21 : C 6.0*

**Influence of vibrations on tool life and surface condition in milling operation**

H. Opitz. *Microtecnic* 1958 Vol 12 (2) pp 72-87 (Apr) 30 illustr. *X* *C 6.2*

**General Electric demonstrates ceramic tool progress**

Gen Electr Co, Metallurgical Products Dept, Detroit. *Carbide Engg* 1958 Vol 10 (5) pp 20-21 (May)

Experimental turning speeds up to 18,000 surface ft/min have been achieved with ceramic turning tools. Grinding processes have been eliminated. 5 illustr, 1 table. *W* *C 12.9*

**Chip-forming machine tools for economic production : III. Boring machines, IV. Milling machines.** Spanabhebende Werkzeugmaschinen fuer die wirtschaflishe Fertigung, III. Bohrmaschinen, IV. Fraesmaschinen

A. Linek. *Werkstatt & Betrieb* 1958 Vol 91 (8) p 513 (Aug) (In German)

Book, Fachverlag Schiele & Schoen GmbH, Berlin. 1957, 68 and 88 pages respectively, illustr. Price : DM 6.40 and DM 8.40 respectively. (In German)

Ultrasonic boring, hand and radial drilling machines, and horizontal drills are dealt with. Part IV covers all types of milling machines, from copying machines to sawing and filing instruments. [Book not in library of Ind Diamond Inf Bur].
*A* *C 2.29 : C 5.23 : C 6.3*

**The design and application of the Wego patent optical tool goniometer**

C. Minaire. *Machinery* (London) 1958 Vol 93 (2388) pp 429-433 (Aug 20)

The Wego goniometer is suitable for measuring a wide range of angles on a variety of cutting tools. 8 illustr.
*W* *D 15.2*

**The mechanics of metal cutting.** Zur Mechanik des Zerspanvorganges

G. Roehlke. *Werkstatt & Betrieb* 1958 Vol 91 (8) pp 473-483 (Aug) (In German)

In the orthogonal machining process which has been carried out according to a new method, the share of rake friction in the cutting force may be calculated from three measurable force components. In this orthogonal method there can be seen, dependent on the angle of rake in the proximity of $\gamma = 0°$, a minimum of the shearing angle which will result in a quick alteration of the shearing angle stress and in a maximum of the cutting force. The evaluation of four different shearing angle equations by other investigators shows that the dynamic equation recently derived by Kronenberg seems to meet well the conditions. 32 illustr. *X* *C 12.5*

**The machinability of heat resistant and stainless work materials in turning, drilling, and tapping.** Zerspanbarkeit hochwarmfester und nichtrostender Werkstoffe beim Drehen, Bohren und Gewindebohren

H. Rohde. *Ind-Anzeig* 1958 Vol 80 (71) pp 1079-1090 (Sep) (In German)

The metals used as heat resistant steels and alloys are forms of Cr steels, Cr-Ni steels, and heavy metal alloys with a basis of Cr-Ni-Co-Fe, mostly with more or less strong additions of Si, Mn, Mo, W, V, Nb, Ta, Ti, Cu, Al, and $N_2$, as well as boron and cerium. Machining is made difficult because of the wear these materials cause to tools owing to hardness, toughness, and strain-hardening. The findings of research into appropriate machining conditions and especially designed tools are described, showing how the difficulties can be overcome. A special cutter was designed for turning operations in view of the tendency of these materials to chatter. Sintered carbide L1 was used. 31 illustr, 23 ref, 4 tables. *A* *C 6.0 : C 6.22*

**Optics in metal cutting machine tools**

N. P. Sobolev. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 953 (July) (Original in Russian)

Book, Gos nauchno-tekhn izd-vo mashinostroit lit-ry, Moscow. 1958, 246 pp. [Not in library of Ind Diamond Inf Bur]. *X* *C 5.3*

**Milling machine parts by boring machines**

M. E. Tsypkin & coll. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 953 (July) (Original in Russian)

Book, Gos nauchno-tekhn izd-vo mashinostroit lit-ry, Moscow. 1958, 339 pp. [Not in library of Ind Diamond Inf Bur]. *X* *C 6.23*

**25 years of high precision engineering.** 25 années de mécanique de haute précision

Ets M De Valliere. *Rev Gén Mécan* 1958 Vol 42 (111) pp 256-272 (May) (In French)

All kinds of laboratory equipment and machine tools for milling, turning, and grinding are depicted, amongst them the H 130 'O' diamond tooled lathe, and the AL 4 multi-spindle lathe equipped for roughing down and diamond finishing of small electric motor commutators. 45 illustr. *A* *C 6.0*

**Increasing labor productivity in high speed machining of wheel parts using metal cutting tools with chipbreakers**

D. L. Yudin. *Trudy MIIT* 1957 (93) pp 94-124 ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 1172 (July) (Original in Russian)

*X* *C 5.3*

**Fundamentals of economic manufacture. VIII**

W. F. Walker. *Tooling* 1958 Vol 12 (9) pp 39-44, 46-47 (Sep)

A discussion of tooling for capstan and turret lathes deals with nose radius, negative rake, coolants, and chip control. Modification of the chipbreaker by clamping a loose piece to the top face of the tool means loss of carbide and diamond. Reamers, spade tools, and the production of threads are also dealt with. 7 illustr.
*W* *C 5.3*

**Contribution to the study of ceramic cutting tools.** Contribution à l'étude des outils de céramiques

R. Weill. *Microtecnic* 1958 Vol 12 (2) pp 51-63 (Apr) (In English)

After setting forth the constitution and the physical properties of metal-cutting ceramic tools, the author makes a comparison between the results achieved with a French-made ceramic tool and those of FI and HI carbide tools on steel and cast iron. To construe the wear resisting features of ceramic tools, the cutting stresses, ratios, and temperatures of both types are investigated, with the result that the better behaviour of ceramic tools is found to be due to a better resistance to temperature, absence of metal binders, and chemical inertia. The resistance of ceramic tools to heavy cutting stresses and to impacts is demonstrated by an unbroken cutting test which showed that some care is needed if maximum efficiency is to be secured. 20 illustr, 7 ref, 1 table. *W* *C 6.23*

**A new method of sound tape control of machine tools.** Ein neues Verfahren der Tonbandsteuerung von Werkzeugmaschinen

L. Tschirf. F. Gaertner. *Werkstattstechnik & Maschinenbau* 1958 Vol 48 (9) pp 473-480 (Sep) (In German)

10 illustr, 7 ref, 3 tables. *A* *C 5.4*

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## CUTTING AND MACHINING OF GLASS

**Autoflow machinery shown at Paris Exhibition**

Autoflow Engg Ltd. *Manufacturing Optician* 1958 Vol 11 (7) p 359 (Apr)

Shown at the Mirror Making Equipment Exhibition, held in Paris, was a model of the Autoflow straight line edger for plate glass round edging and polishing. The machine uses 3 × 10 in. diameter diamond wheels, and 3 × 12 in. diameter composition polishing wheels. The combination of a conveyor system and rapid polishing permits 600 ft of polished round edge to be produced in 1 hr, against 50 ft by traditional methods and 100 ft by hand diamond machines. 1 illustr.
*W* *C 7.23*

**The microhardness and coefficient of linear expansion of several glasses of the porcelain glass phase type**

A. I. Avgustinik, E. P. Fedorova. *Journ Appl Chem* (USSR) 1953 p 925 ; *Consult Bur Chem Coll No 2 Glass, Glazes and Enamels* pp 122-126 ; *Soc Glass Techn Journ* 1958 Vol 42 (207) pp 136A-137A (Aug) (Original in Russian)

*X* *C 2.28 : C 4.32*

**Observations on glass cutting by diamond**

P. R. Ord (Kodak Ltd, Wealdstone, Harrow). *Soc Glass Techn Journ* 1957 Vol 41 (201) pp 245T-258T (Aug)

The principal obstacle in obtaining a clean vertical fissure in glass is the formation of more or less horizontal cracks which lead to splintering, and, in severe cases, to the prevention of the formation of the vertical fissure. If the diamond is accurately cut to the correct shape and firmly held in position under controlled pressure, the horizontal cracks are of negligible dimensions and no splintering occurs. The best shape of cutting diamond is shown, and diagrams show the opening of the cut in the glass. As the diamond is pressed into the glass, it creates high tension over the surface, the glass moves forward, and the diamond penetrates more deeply. When the glass reaches breaking point, two cracks appear running obliquely from the point of the diamond. Immediately, the tension is removed and the diamond, penetrating deeper still, sets up a new tension between these two cracks; the yield point is easily reached and the main fissure is formed beneath the point of the diamond. The two sideways cracks close up. The heat generated is such that the glass at the top of the fissure becomes plastic and flows beneath the facets to squeeze into the top of the fissure. This prevents the fusion of the glass over the fissure and might cause the sideways cracks to open up again. If the split is formed immediately, these two cracks are freed from the stresses creating them, extend no further, and do not splinter off. The author continues to discuss in detail the significance of cutting, 'leaving', and ridge angles, control of splinter formation, and diamond adjustment. 20 illustr, 2 ref.

*A* *C 7.21*

**Optical and physical properties of some calcium aluminate glasses**

H. C. Hafner, N. J. Kreidl, R. A. Weidel (Bausch & Lomb Optical Co, Rochester, NY). *Am Ceram Soc Journ & Abstr* 1958 Vol 41 (8) pp 315-316 (Aug)

Calcium aluminate glasses containing alkali oxides and iron oxide will transmit infrared radiation to about 6 microns and still have satisfactory working properties. Their refractive index, density, expansion, Young's modulus, modulus of rupture, fracture velocity, Knoop hardness, and some electrical and chemical properties are evaluated. 14 illustr, 5 tables.

*X* *C 2.2*

**The polarisation microscope used for examining ceramic and glass raw materials.** Das Polarisationsmikroskop im Dienste der Untersuchung keramischer und glastechnischer Rohstoffe

M. Mehmel. *Glas-E-K-Technik* 1958 Vol 9 (7) pp 245-250 (July) (In German)

Before they can be examined in the microscope, glass and ceramic samples are either ground to very thin plates or crushed to form a powder. The cutting of thin plates is done by means of a diamond cutting wheel at about 4,000 rev/min, which cuts plates of 2 to 3 mm thickness. 7 illustr, 10 ref.

*A* *C 5.23 : D 15.2*

**USP 2,826,878** (Aug 30, 1955) **F. W. Lindblad**

**Grinding wheel**

In the grinding of the edges of safety glass with a conventional grinding wheel, a groove often appears in the central portion of the wheel rim. The uneven wear makes replacement necessary before the major portion of the rim is worn down. The reason for uneven wear is probably the development of an abrasive compound of glass particles and powdered parts of the wheel rim on the tacky portions of the lamina in the safety glass. Clearance spaces in the wheel rim could be used to remove such compound by providing, *eg* spaced abrasive segments, but these cause vibration and chattering. The difficulties have been overcome by forming the wheel rim of abrasive segments which are in contact along a portion of their width but separate along other portions to provide the required clearance spaces. These last portions are so spaced that the periphery of the wheel varies with the abrasive qualities of the workpiece, so that even wear results. (12 claims, 9 illustr). Ref cited : 6 USP.

*J* *C 7.23*

**USP 2,828,197** (Sep 15, 1954) **P. W. Blackmer jun, Norton Co**

**Metal bonded diamond wheels**

The wheels are intended for glass edging, bevelling, lens roughing, generating for optical instruments and cameras where the rate of cut, absence of chipping, or surface finish is important. The wheel is composed of crushed diamond (1 to 50% vol) bonded with sintered metal containing (by weight) 17 to 25% alpha plus delta bronze of copper alloyed with metal selected from the group tin, cadmium, zinc, aluminium, gallium, indium. The bronze may be from 15 to 85% alpha, and from 85 to 15% delta. The remainder of the metal bond is at least 99% ferritic iron, with a maximum of 0.15% carbon. The iron forms the skeleton, the pores of which are filled with the brittle bronze. (4 claims, 3 illustr). Ref cited : 4 USP.

*J* *C 7.23 : D 8.22*

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## MACHINING OF STONE, ETC

**Sawing and machining glass-reinforced plastics with diamond-coated tools**

L. H. Barron (Dia-Chrome Co, Glendale, Calif). *Plastics Technol* 1957 Vol 3 (6) pp 467-472, 480 (June)

The extensive use of diamond tools in this field is described, and several applications are considered individually. The need is stressed for major contractors to follow their sub-contractors in re-tooling with diamond tools.

The different types of diamond tool available are discussed, and the Dia-Chrome type of saw, *ie* having an almost 100% concentration of diamond on the periphery, is recommended. The adaptability of diamond tools permits designs in plastics which were not previously feasible owing to the lack of suitable tools. Case histories are cited of several difficult machining operations overcome by the use of diamond tools. Applications for diamond tools in the aviation industry include the machining of radomes and propeller afterbody assemblies. Other uses described include the cutting of laminated deflector tubes, planing polyester planks, edge-planing plastic sheets, and sawing 4½ in. thick disks of Pyrex glass. 8 illustr.

*W* *C 8.22 : C 8.71*

**Thin diamond cutting wheels**

Navan Products Inc, 1318 Second St, Santa Monica, Calif. *Carbide Engg* 1958 Vol 10 (7) p 22 (July)

Wheels particularly suitable for the production of germanium and silicon transistors and rectifiers are now being produced under the trade name Diatronic. They have diamond cutting edges ranging from 0.006 in. in width, with a tolerance of 0.0005 in. In dicing germanium and silicon crystals for transistors and rectifiers, loss of silicon or germanium as saw dust has been reduced to 45%.

*A* *C 5.23*

**Cutting performance of dental carborundum wheel[s]**

N. Kinoshita, F. C. Liu. *Sci Res Inst Journ* (Japan) 1958 Vol 52 (1474) pp 41-49 (Mar)

A study of dental aluminium oxide wheels was carried out in order to determine the optimum combination of mesh size and grinding conditions for clinical operation. The wheel testing method was as follows : a testpiece—either a tooth or a piece of photographic plate glass, was mounted in a special holder. This was ground until the wheel under test made full contact with the testpiece surface. The wheel was then retracted and the glaze removed by a diamond dressing tool, following which the grinding proper was carried out. It was found that 0.2 mm was the minimum amount of material that should be removed from the wheel by diamond dressing. The variables, *eg*, wheel speed, pressure, were adjusted until the optimum combination was reached. Comparative tests were made on glass, and it was found that, in scratch testing by diamond-point, the glass quickly fractured. Wet grinding efficiency on glass was low.

It was concluded that (*i*) the higher the grinding speed, the lower the efficiency of grinding ; (*ii*) the cutting efficiency increases with the roughness of the grain ; (*iii*) the grinding resistance increases with the weight removed per cut, and decreases with the increase of grinding speed ; and (*iv*) wet grinding is suitable for dentistry. 17 illustr, 3 tables.

*W* *C 7.25*

**Stone cutting in the Urals**

B. Pavlovskii. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 952 (July) (Original in Russian)

Book, Sverdlovskoe knizhnoe izd-vo. 1953, 150 pp. [Not in library of Ind Diamond Inf Bur].

*X* *C 8.0*

## ROCK DRILLING

**Core drilling in prospecting**

B. I. Vozdvizhenskii & coll. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 953 (July) (Original in Russian)

Book, Gos nauchno-tekhn izd-vo lit-ry po geol i okhrane nedr, Moscow. 1957, 591 pp. [Not in library of Ind Diamond Inf Bur]. *X* *C 9.2*

## WIRE DRAWING

**Heat treatment and cleaning in wire production**

E. Hague. *Metallurgia* 1958 Vol 58 (346) pp 80-83 (Aug) 8 illustr. *X* *C 11.4*

**Relationships in the drawing of metal wire in presence of lubricants**

S. Ya. Veiler, V. I. Likhtman. *Doklady Akad Nauk SSSR* 1957 Vol 114 (6) pp 1224-1227 (Original in Russian)

[Transl av, H. Brutcher, PO Box 157, Altadena, Calif. Price : $4.35, No 4293].

*X* *C 11.0 : D 14.2*

**LITERATURE REQUESTS**

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## GRINDING AND POLISHING OF HARD METALS

**Questions and Answers**

A. Rakestraw. *Grinding & Finishing* 1958 Vol 4 (4) p 37 (Aug)

A reader asks how synthetic diamonds compare with natural diamonds in grinding efficiency. The answer states that synthetic diamonds have shown a better performance when used with resin or vitrified bonds on sintered tungsten carbide, and adds that synthetic diamonds are unsuitable in mesh sizes coarser than 100, and for applications where heavy pressures and infeeds are used. *W* *C 12.0*

**Thoughts on lapping surfaces.** Quelques considérations sur le rodage des surfaces

Anon. *L'Usine Belge* 1958 Vol 35 (1590/1591) pp 6-7 (Aug 9, 16) (In French)

Lapping consists in producing a perfect finish on a surface worn down by tools. Whereas formerly the abrasive was loose and combined in an emery powder between die workpiece and the lapping instrument, it is now fixed to a stone of the desired shape, and cuts fine chips away from the surface to be lapped. The geometrical cutting speed of the abrasive is made up by the peripheral speed of the lapping stone in relation to the diameter of the workpiece and the axial speed. For semi-hard steel, a peripheral speed of 15 to 30 m/minute and an axial speed of 8 to 18 m/minute will be required, according to the grade of stone used. The important point is that the axial displacement should be synchronized with the rotation so that the grain does not fall always in the same place. The different applications of lapping are described. Aluminium oxide is recommended for bronze and cast iron, and corundum for steel. Lapping stones may be of aluminium oxides or silicon carbide, and experiments have been made with stones of sintered materials, special bonds, and diamond dust, which produce very good results because wear is minimized.

*A* *C 13.2*

**Better tool manufacture with diamond grinding wheels.** Besserer Werkzeugbau mit Diamant-Schleifkoerpern

Anon. *Der Plastverarbeiter* 1958 Vol 9 (1) pp 15-16 (Jan) (In German)

Diamond is recommended for grinding and lapping all sintered carbides, germanium, glass, quartz, steatite, porcelain, carbon, natural and artificial hard stones, fireproof materials, agate, sapphire, ruby, hard synthetic substances, and hardened steels from a Rockwell hardness of 64. The different bonds for diamond wheels are given, and different applications of these are mentioned. Wheels with metal bonds are particularly suitable for dry grinding, as the diamond grains tend to protrude more from the bond. The advantages of diamond wheels, in cutting more quickly and lasting longer, are dependent on solidly constructed machines free from vibration and having the correct setting. They will last longer if always used for wet grinding, and if sintered carbide tools are first rough ground with silicon carbide or bronze-bonded diamond wheels, and finally lapped with a synthetic bond. Typical wheel speeds are listed. 2 tables.

*A* *C 8.3 : C 12.3 : C 13.2*

**Small wheel attachment for optical profile grinder**

Anon. *Tooling* 1958 Vol 12 (9) pp 64-65 (Sep)

Grinding wheels of $\frac{1}{4}$ to $\frac{1}{2}$ in. diameter are available for forming small radii on the Wickman optical profile grinder. 2 illustr. *W* *C 7.23*

**Techniques in ceramic grinding**

E. L. Sinclair (Norton Co). *Grinding & Finishing* 1958 Vol 4 (1) pp 50, 52, 54 (May)

Silicon carbide wheels are recommended for soft state grinding, and for grinding where very fine forms are necessary. Harder ceramics, *eg* radomes and ceramic cutting tools, require diamond grinding wheels. When using diamond wheels, it is advisable to use the coarsest mesh size commensurate with finish requirements ; 100 mesh diamond is suggested for fixed feed centreless, surface, and cylindrical grinding. Diamond of 50 mesh is suggested for cut-off and hand grinding operations. The types of diamond wheels most suitable for grinding ceramics are described. One diamond wheel, employed on a Cincinnati No 2 centreless grinder, cost $25,000, and is believed to be the most expensive diamond wheel ever made. The wheel has a diameter of 20 in., and a 6 in. face of ¼ in. diamond depth. It is used for grinding steatite rods for the textile industry, and, for nearly three years, has been used on three shifts, five days a week.

The advantages to be obtained by changing from silicon carbide to diamond grinding wheels are illustrated by reference to actual machine shop experience. The effect of vibration on diamond grinding wheels is briefly explained. 5 illustr.

*W* *C 5.3 : C 8.3*

**Fritz Wendt tool sharpening machines**

Fritz Wendt KG, Duesseldorf. *Machinery* (London) 1958 Vol 93 (2391) pp 618-619 (Sep 10)

The WF 6000 tungsten carbide tool sharpening machine embodies the patented process of sharpening with a resin-bonded diamond-impregnated lapping block. Higher surface finish is claimed, and reground tools are reported to have a longer life than when ground with a rotating diamond grinding wheel. The two diamond lapping blocks are dovetailed into a holder which is reciprocated at 2,800 strokes/minute. Vertical reciprocation is governed by a separate motor. Both lapping blocks are diamond-impregnated on the vertical surface, and one has in addition a diamond-impregnated lower edge for finishing chipbreaker grooves.

A new development is a machine which employs a 5 in. diameter diamond-impregnated cup wheel for grinding chipbreaker groove step faces. The angle is formed by combined vertical and horizontal movements. A similar machine, which lacks certain features of the first, is suitable for general tool sharpening operations. It employs a 5 in. diameter diamond cup wheel. 4 illustr.

*W* *C 12.3 : C 13.2*

**How poor grinding speaks for itself**

Anon. *Canad Machinery* 1958 Vol 69 (8) pp 78-79, 82 (Aug)

Common faults produced on a workpiece following centreless grinding are discussed, and the method of deducing the cause from the nature of the fault is described.

*W* *C 5.0*

**Research in grinding.** Untersuchungen beim Schleifen

Anon. *Industrie-Anzeig* 1958 Vol 80 (66) p 1011 (Aug 19) (In German)

Book, 8th Research Report of the Laboratoriums fuer Werkzeugmaschinen und Betriebslehre der Rhein-Westf Technischen Hochschule, Aachen. Verlag W. Girardet, Essen. 1958, 38 pp, illustr. Price : DM 5.80 (In German).

The following subjects are treated : grinding mechanics, chip size, wear, wheel truing, form truing, grinding wheel structure, and belt grinding. [Book not in library of Ind Diamond Inf Bur].

*A* *C 5.21 : C 5.3*

**Grinding replaces conventional cutting at Whirlpool Corporation**

D. Ward. *Grinding and Finishing* 1958 Vol 4 (1) pp 22-29 (May)

The development of techniques for producing compressor units is described. Rubber-bonded cut-off wheels are used for rough and finish grinding of the vane slots. The wheels are diamond trued for finish grinding, and, when they fall below tolerance limits for this operation, they are re-trued for rough grinding. On further break-down, the wheel is cut down from 16 in. diameter to become a 14 in. diameter finish grinding wheel ; it is then re-used as before. Economies in diamond truing tools were effected by using accurately orientated and centred diamonds in the tool ; these give better results with less wear. Various finishing operations for the rotors are described. 21 illustr.

*F* *C 5.0 : C 5.21*

**Grinding reamers.** Schleifen von Reibahlen

Anon. *Technik & Betrieb* 1958 Vol 10 (8) yellow insert page (Aug) (In German)

Practical suggestions for the grinding and testing of reamers are made. The best cutting speed and thrust, as well as the appropriate tools and working statistics for each different type of material, are described. The suggestions are for various kinds of steel, cast iron, light metal, and plastic reamers, and the tools for grinding are of sintered carbide. 3 tables.

*A* *C 6.2 : C 12.6*

**Saw blade grinding machine grinds large circular saws**

Cawi Machine Co Inc, 34 Exchange Place, Jersey City 2, NJ. *Am Machinist* 1958 Vol 102 (8) pp 236-237 (Apr 21)

The dust-proof Tempo saw blade grinder is suitable for large circular blades with solid or inserted teeth. High and low teeth are produced automatically in one operation, and it is designed to accommodate straight or curved teeth and chamfers. An automatic model is available for blades from ¼ to 8 in. ; it incorporates automatic infeed and a diamond grinding wheel. 1 illustr.

*W* *C 5.23*

**Diamond wheel line introduced by Elgin**

Elgin Nat Watch Co, Elgin, Ill. *Carbide Engg* 1958 Vol 10 (7) p 28 (July)

The firm is expanding its industrial diamond line to include a complete assortment of diamond wheels. The new diamond wheel line is expected to have wide application among carbide fabricators and regrinders, glass manufacturers, stonecutters, and in construction work. Wheels will range in size from ¼ in., used for carbide internal grinding, to a 48 in. wheel for concrete cutting. They will be available in resinoid, metal, or vitrified bonds.

*A* *C 5.0 : D 8.0*

**A new development in internal gear grinding**

The Gear Grinding Co Ltd, Shirley, Solihull, Birmingham. *Metalworking Prodn* 1958 Vol 102 (22) pp 952-956 (May 30)

The new internal gear grinder produces gears to an accuracy of 0.0001 in./in. of face width in generated lead with a surface finish of 8 to 10 micro-inches. The wheelhead is mounted on a double slide which allows for both truing and grinding feed. Two separate diamond truing mechanisms are used : a pantographic mechanism with a 10 : 1 reduction ratio for copying the shape of two involute cams on the side faces of the wheel, and a unit for dressing the root shape of the tooth space on the wheel periphery. The truing and grinding principles, which are identical to those employed in the Orcutt spline and gear grinding machines, are fully illustrated and described. 8 illustr.

*W* *C 5.0*

**The preparation of tin and tin alloys for micro-examination**

B. L. Eyre. *Metallurgia* 1958 Vol 58 (346) pp 95-106 (Aug)

An account is given of the techniques used in the Tin Research Institute for polishing tin and tin alloys for micro-examination, both in massive form and as coatings. The methods are based on conventional grinding and polishing techniques, using specially selected abrasives and polishing cloths. Diamond abrasives are employed for the major part of the fine polishing. The text is accompanied by photomicrographs which illustrate various aspects of the techniques of polishing and etching. 31 illustr, 7 ref, 3 tables.

*X* *C 12.61*

**The possibilities of tool grinding exemplified by a Swedish universal tool grinder.** Die Moeglichkeiten des Werkzeugschliffes am Beispiel einer schwedischen Universal-Werkzeugschleifmaschine

H. Gerlach. *Werkstattstechnik & Maschinenbau* 1958 Vol 48 (9) pp 487-491 (Sep) (In German)

The machine used is the Svenska Ackumulator AB Jungner universal tool grinder, and various attachments for angle-milling, spiral grinding, optical form grinding, wheel truing, etc, are described. 14 illustr, 2 ref.

*A* *C 5.3*

**Residual grinding stresses can be minimized**

M. W. Gormly. *Tool Eng* 1958 Vol 41 (2) pp 51-54 (Aug)

Grinding tests indicate that significant amounts of metal can be removed from a workpiece without inducing serious residual stresses. The author reviews some of the research work in this field with the practical implications of the studies on these stresses. 6 illustr, 3 ref. *X* *C 5.3*

**Hydraulic surface grinder**

Graham Machine Tool Co, 19 Cleveland Place, New York 12, NY. *Am Machinist* 1958 Vol 102 (8) p 240 (Apr 21)

The Astra H-24 hydraulic surface grinder uses a special wheel balancer and adjustable wheel mounts to provide high accuracy working. A built-in diamond wheel truer is provided. 1 illustr.

*W* *C 5.0 : C 5.21*

**Development of lapping for quartz oscillator plates**

I. Ida, Y. Arai. *Electrical Communication Lab Reports* (Japan) 1958 Vol 6 (1) pp 12-20 (Jan) (In English)

A multiple crystal finisher using fine emery in paraffin allows several quartz crystals to be lapped in one operation. Pneumatic thickness gauges ensure an accuracy better than 1 micron. 14 illustr, 3 ref, 1 table.

*W* *C 13.2*

**Advanced grinding technology**

G. B. Lur'e. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 951 (July) (Original in Russian)

Book, Vses uchebno-pedagog izd-vo Trudrezervizdat, Moscow. 1957, 125 pp. [Not in library of Ind Diamond Inf Bur]. *X* *C 5.5*

**Large-scale sawing installation at aluminium works**

Northern Aluminium Co Ltd, Bush House, Aldwych, London WC2. *Machinery Lloyd* 1958 Vol 30 (14A) p 74 (July 12)

A new carbide tipped metal cutting saw can cut aluminium plate up to 57 × 10 ft by 6 in. thick. The top clearance angle of the teeth is diamond lapped to a tolerance of ±0.001 in. 1 illustr.

*W* *C 5.23 : C 13.2*

**On correcting initial errors in circular grinding**

G. B. Lur'e. *Stanki i Instr* 1958 Vol 29 (7) pp 24-26 (In Russian)

1 illustr, 9 ref. *X* *C 5.4*

**44 Alundum wheels introduced one year ago**

E. J. Powers (Norton Co). *Grits & Grinds* 1957 Vol 48 (11) pp 9-12 (Nov)

Typical applications of, and results from Alundum aluminium oxide grinding wheels are reported. Uses include cylindrical, centreless, and thread grinding operations. 2 illustr. *W* *C 5.3*

**A new polishing material.** Ein neues Poliermittel

F. Prietl. *Werkstatt & Betrieb* 1956 Vol 89 (10) p 574; *Glastechn Ber* 1958 Vol 31 (8) p 329 (Aug) (In German)

This material, suitable for glass, is of particularly fine and even grain, and very hard. Carbon, *eg* as acetylene dross, is dispersed in a liquid base by intensive ultrasonic vibrations, and then further treated to form very closely bound particles. The grinding qualities of this substance approach those of diamond, and the size of the particles can be regulated.

*A* *D 14.1*

**Increasing the strength of abrasive wheels**

D. I. Sigaev. *Biul TSNIICHM* 1957 (17) p 47; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 1137 (July) (Original in Russian)

*X* *C 5.2*

**Man-made diamonds in grinding wheels increase grinding efficiency by 35%**

Simonds Abrasive Co, Tacony & Fraley Sts, Philadelphia 37, Pa. *Grinding & Finishing* 1958 Vol 4 (4) p 47 (Aug)

Synthetic diamond grinding wheels are available in addition to grinding wheels employing natural diamond. Increased efficiency is claimed for the synthetic wheels. 1 illustr. *W* *C 12.0*

**New plunge grinding method for grinding sintered carbides.** Neues Tiefschleifverfahren zum Schleifen von Hartmetallen

J. Taeyaerts. *Technica* 1958 Vol 7 (17) pp 975-977 (Aug 15) (In German)

German translation of an article by J. Taeyaerts which was published in *Ind Diamond Rev* 1952 Vol 12 (145) pp 266-270 (Dec); see *Bibl Ind Diamond Appl* 1953 Vol 10 p 33 (Jan). *A* *C 12.2*

**On the effect of technological factors on the depth of work-hardening during polishing**

Yu. S. Terminasov, A. G. Yakhontov. *Metallov i Obr Metallov* 1958 (5) p 40; *DSIR Transl Contents Lists Russ Period* 1958 (114) p 74 (Sep) (Original in Russian)

*X* *C 4.5 : C 13.2*

**Lapping compound**

Titan Tool Supply Co Inc, 1419 Hertel Ave, Buffalo 16, NY. *Grinding & Finishing* 1958 Vol 4 (4) p 56 (Aug)

Claimed to have over 80% of the hardness of diamond, Tetrabor lapping compound is suitable for a wide range of lapping operations. 1 illustr.

*W* *C 13.2*

**Making the thinnest watch in the world**

Vacheron et Constantin. *Watchmaker*, etc 1958 pp 62-64 (Aug)

A short description of the production of thin watches. The ébauches for the watches are polished to very fine tolerances with a diamond 'cream'. 7 illustr.

*W* *C 13.1*

**USP 2,823,492** (July 16, 1954) **R. M. Arbuckle, J. R. Hamilton, General Motors Corp**

**Grinding machine and method**

Grinding of rough cast or forged turbine blades, thus dispensing with the costly machining of each blade individually, is made possible by a compensating device adjustable to the diameter of the grinding wheel as it is worn, so that the wheel engages the blade always along the same path as controlled by a master cam. The adjustment of the wheel is accomplished by mounting the wheel motor on a cradle having a fixed axis of rotation, and by eccentrically positioning the axis of the worn wheel from the cradle axis so that rotation of the cradle causes the wheel to describe an arcuate path which will bring the wheel at progressive positions along the arcuate path of the workpiece. Before adjusting the wheel it is trued by a truing device, which, after truing, is pivoted to the side of the machine. (7 claims, 13 illustr). Ref cited : 12 USP.

*J* *C 5.3*

**USP 2,823,496** (Mar 16, 1953) **O. W. Winter**

**Grinding devices**

It has been discovered that certain types of grinding wheels will successfully grind carbide-tipped tools at surface speeds of approximately 25,000 ft/minute. In order to protect the wheel against rupture at such high speeds, the wheel is formed with a tapered outer periphery and an inner cylindrical periphery, and a reinforcing ring is screwed over the tapered face onto the base plate holding the wheel, while a passage through the shaft leads coolant into a central chamber in the wheel from which it is distributed over the exposed grinding face in front of the wheel. When a cylindrical face is used instead of a tapered face, the wheel is held by a clamping plate in front of the wheel shaft, and a packing between wheel and reinforcing outer ring assures close gripping contact. Some other forms of reinforcing rings, *eg* for profiled annular wheels, are also shown. (10 claims, 8 illustr). Ref cited : 21 USP ; 1 FP ; 1 Italian P ; 1 DBP.

*J* *C 5.3*

**USP 2,824,412** (July 7, 1955) **J. W. Parker**

**Internal grinding machine**

The grinder is intended for manual and semi-automatic operations in smaller workshops. A cam-actuated sizing unit, driven by the reciprocating table, feeds the grinding wheel into the work on a cyclic basis. A diamond truing device acts as a primary element of the sizing control in semi-automatic operation. The truing device is swung about an angle of 90° into and out of the truing position. The diamond holder is advanced by a micrometer until the diamond point just touches the wheel face after a workpiece has been ground to correct size. The wheel is then advanced into the diamond to be trued, and the control is then set for automatic operation. (14 claims, 11 illustr). Ref cited : 7 USP. *J* *C 5.3*

**USP 2,824,556** **W. H. Bateman, Wickman Ltd** (May 24, 1954—conv date, Gt Britain)

**Method and means for shaping and trimming helically formed grinding wheels**

For grinding gear wheel teeth of involute form, the grinding wheel is to be provided with a helix of pitch and form corresponding to that of a worm wheel meshing with the gear wheel to be ground. Hitherto, such a helix has been produced by means similar to those used in cutting screw threads, or by crushing rollers. In the new method, a rotary tool resembling a toothed wheel is used, the contour of which is conjugate to that of the form to be imparted to the grinding wheel. The tool is traversed parallel with the axis of the grinding wheel, and rotated at a rate corresponding to an engagement with a rotating helical gear wheel of the appropriate pitch. The cutting tool is made of a hard metal composition (tungsten carbide) or a metal matrix with diamond grains embedded therein. (15 claims, 5 illustr). Ref cited : 10 USP.

*J* *C 5.21*

**USP 2,825,638** (July 27, 1955) **A. C. Booth, US Rubber Co**

**Grinding wheel manufacture**

The standard procedure for making rubber-bonded grinding wheels is very expensive. One of the major factors contributing to the high costs of such wheels is the necessity of using mills for breaking down the rubber. These mills are expensive, and their maintenance requires high costs and excessive labour. Now it has been discovered that by using a liquid butadiene-acrylonitrile copolymer in a certain manner, and by carrying out the hot-pressing of the wheel in two stages, it is possible to make wheels having the desirable characteristics of ebonite-bonded wheels at a far lower cost. A granular mix is prepared from abrasive grains, sulphur, a solution of the liquid butadiene-acrylonitrile in furfural, and mixed with a dry powdered blend of a thermosetting phenol-aldehyde resin, lime, and filler. This mix is poured into a pre-heated mould and subjected to heat and pressure, first light, then high, and cured. (6 claims, 2 illustr). Ref cited : 3 USP.

*J* *D 8.21*

**USP 2,826,015** (July 26, 1955) **W. Osenberg, Bisterfeld & Stolting**

**Rotary grinding wheels**

Flexible resin-bonded grinding disks with intermediate layers of strips of high tensile strength can be used at appreciably higher cutting speeds than ceramic-bonded disks, but they are not suitable for face grinding. Nevertheless, resilient face grinding rings have been made with conically inclined walls, but they require special resins and special measures for properly positioning the reinforcing fabric layer used for such rings. The new flexible grinding disk is made as a cylindrical annulus exclusively for face grinding ; it has a small wall thickness in comparison to its radius. The face may be continuous, or slotted and composed of segments. Manufacture is effected either by tightly winding on to a mandrel widths or strips of foils impregnated or coated with, *eg* phenol formaldehyde condensate in which abrasive grains are distributed, and using heated pressure rollers, or by pressing unhardened laminations in cylindrical moulds. They are finally hardened and inserted into backings. Several annuli of different diameters may be arranged concentrically in a common backing. (11 claims, 9 illustr). Ref cited : 9 USP ; 1 BP ; 1 FP. *J* *D 8.21*

**USP 2,826,016** (Feb 6, 1956) **E. Hurst, Rexall Drug Co**

**Reinforced abrasive products**

Reinforcing components in the form of high tensile strength, long, fibrous or filamentary base materials are embodied in the wheel in close association with a second component of pyrophoric characteristics which will cause the end of the entire reinforcement at the grinding face to disintegrate. This action removes the reinforcing material from the grinding face and leaves small open spaces to expose additional sharp cutting edges, while the protection against disruption of the wheel remains unimpaired. Fine steel wire, nylon yarn, and glass fibres are mentioned, and magnesium, aluminium, silicon, and zirconium are suggested as pyrophoric materials. (14 claims, 5 illustr). Ref cited : 5 USP ; 1 Norwegian P. *J* *D 14.1*

**USP 2,826,877** **K. Lau, Ernst Winter & Sohn** (Jan 26, 1956—conv date, Germany)

**Diamond grinding and polishing device**

Grinding devices have been provided with intermediate spring members which, however, are exposed to fatigue and are difficult to adjust to specifications. These drawbacks are eliminated by using a large flexible intermediate member between hub and grinding ring as shown in Fig 2. Grinding disk 1 with grinding layer

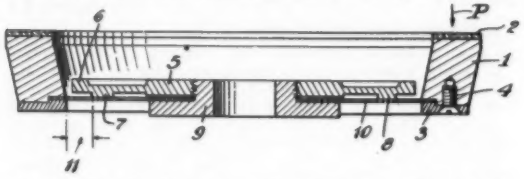


*Fig 2. The flexible intermediate member 10 is clearly shown in this illustration. USP 2,826,877.*

2 is clamped by ring 3 to flexible disk (membrane) 10 which is secured to hub 9 by tensioning ring 5 screwed on to the hub. Ring 5 engages disk 10 with annular rib 7 or, if turned upside down, with annular rib 6, in order to adjust the elasticity of disk 10. By providing and selecting tensioning rings with annular ribs of different sizes, any desired elasticity may be obtained. (6 claims, 5 illustr). Ref cited : 5 USP ; 1 BP.

*J* *C 12.6*

**USP 2,827,740** (Feb 29, 1956) **L. E. Lee**

**Polishing treatment for article surfaces**

Automatic abrasive type polishing is carried out by means of a rotating magnetic fluid which alternately frictionally engages and releases an article to be polished as it is reciprocated in the magnetic field. A rotating vessel contains oil, metal powder, and abrasive particles. The intermixed metal powder and particles are alternately magnetized and demagnetized, and orientated so that different edges are presented to the work continuously. The abrading material has thus practically infinite life, and operation is smoother and quicker. The following specifications are mentioned in the text : USP 2,664,676 ; 2,460,918 ; 2,460,919 ; 2,591,083 ; 2,554,701. (5 claims, 1 illustr). Ref cited : 3 USP.

*J* *C 12.9*

## NEW MACHINING METHODS

**Information about the electrolytic polishing and deburring of steel.** Hinweise ueber das elektrolytische Polieren und Entgraten von Stahl

H. Kohlhase. *Feingeraetetechnik* 1958 Vol 7 (9) pp 418-422 (Sep) (In German)

In the VEB Rheinmetal Soemmerda, electrolytic grinding and deburring are used in mass production. Electrolytic polishing is carried out and followed by glavanisation. Electrolytic deburring is applied after the mechanical working. With the introduction of these methods, and careful choice of appropriate workpieces and materials, economies are made by the reduction of wear. General information about surface finish, the theory of electrolytic polishing and deburring, and a comparison of methods is provided. Some instances of the application of the methods are described. In electrolytic grinding, the friction coefficient, and thus the wear, is diminished. 23 illustr, 6 ref, 4 tables.

*A* *C 12.9*

**Spark erosion machines.** Funkenerosionsmaschinen

Fritz Duesseldorf, Freiburg/Br. *Werkzeugen und Werkzeugmaschinen* 1958 (14) pp 4-8 (In German)

The basic principles of spark erosion processes are reviewed, and various machines for the purpose are described, including the types E 1500 and EA 200. The type of work which can be done with each machine is shown. 10 illustr.

*A* *C 12.9*

**Electrical discharge machining in the USA**

M. Lorant. *Tooling* 1958 Vol 12 (9) pp 48, 50-52 (Sep)

A review of methods and apparatus employed. The Douglas Aircraft Co forms carbide tipped lathe tools, carbide tipped radius forming tools, and many other types by this method. 4 illustr.

*W* *C 12.9*

**Research into utlrasonic techniques.** Einfuehrung in die Ultraschalltechnik

J. Matauschek. *Werkstattstechnik und Maschinenbau* 1958 Vol 48 (9) pp 518-519 (Sep) (In German)

Book, VEB Technik, Berlin. 1957, 536 pp, 349 illustr. Price : DM 36.-- (In German). [Not in library of Ind Diamond Inf Bur].

*A* *C 2.29 : C 12.9*

**Spark erosion machining—some applications in watchmaking and in precision instruments manufacturing**

R. Mimeur. *Microtecnic* 1958 Vol 12 (2) pp 69-71 (Apr) 5 illustr. *W* *C 12.9*

**Friction cutting of metals**

I. S. Shuvalov. *Biul TSIIN tsvet met* 1958 (1) pp 31-33 ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (4) p 1172 (July) (Original in Russian)

*X* *C 12.9*

**A new reality : tool sharpening by electric sparks.** Une réalité nouvelle : l'affûtage d'outils par étincelage

M. Planchon. *La Machine Mod* 1958 Vol 52 (594) pp 25-26 (Sep) (In French)

Advantages of the method are described. 2 illustr.

*A* *C 12.9*

**Grinding of hard metals with electrically conducting abrasives using graphite as a filler**

I. K. Trushin. *Vestnik Mash* 1957 Vol 37 (5) pp 59-61 (Original in Russian)

A development of electrolytic grinding — electro-abrasion — uses an electrically conductive grinding wheel and an anodic solution for removing metal. Figures given show that stock removal is faster than with a diamond wheel of organic bond, and that a comparable finish can be obtained. It is claimed completely to eliminate the use of diamond dust in the preparation of metallographic specimens. [Transl av. H. Brutcher, PO Box 157, Altadena, Calif. Price $3.90, No 4105].

*W* *C 12.9*

**The mechanism of the electrolytic polishing of metals and the structure of the polished surface**

G. S. Vozdvizhenskii & coll. *Doklady Akad Nauk SSSR* 1958 Vol 120 (1) p 101 ; *DSIR Transl Contents Lists Russ Period* 1958 (114) p 24 (Sep) (Original in Russian)

*X* *C 12.9*

**LITERATURE REQUESTS**

**Please quote the page number of the Bibliography containing the original reference, and the author and title of the article, in all cases.**

**USP 2,825,186** (Feb 27, 1956) **L. J. Palush, Gulton Industries Inc**

**Ultrasonic drill**

When several intaglio cuts have to be made of the same or of different shapes up to the same depth, extremely accurate measuring and resetting devices are required. The new drill simultaneously cuts two or more holes to a predetermined depth. The transformer used in this device possesses bilateral symmetry, whereas previously used transformers had radial symmetry. Its longitudinal dimension is substantially greater than the lateral dimension, and several tools may be affixed to the end of this mechanical transformer. The electro-mechanically sensitive body of the drill may be a piezoelectric ceramic bar. (4 claims, 4 illustr). Ref cited : 4 USP ; 1 FP.

*J* *C 2.29 : C 6.0*

**USP 2,826,540** (Sep 18, 1952) **G. F. Keeleric**

**Method and apparatus for electrolytic cutting, shaping and grinding**

The shaping of sintered carbide tools, turbine blades, etc, requires diamond wheels. Electrolytic removal of material, on the other hand, has been fairly slow hitherto, and the equipment was costly. Surface control has been difficult. In the new electrolytic method, a rotatable electrode or wheel 10 (Fig 3) is used with

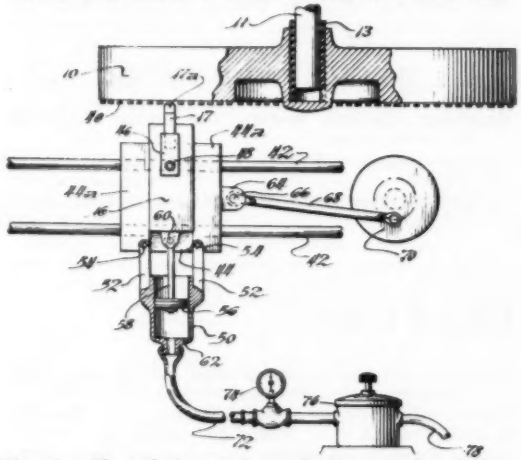

*Fig 3. Electrolytic cutting, shaping, and grinding apparatus. USP 2,826,540.*

diamond boart fixed to the electrode as insulating abrasive 'spacers' 40 projecting from the electrode only 0.001 in. or less (0.0007 inch). The workpiece, *eg* a tool tip, is pressed against the diamond particles with pressures used for ordinary diamond grinding. The electrolyte may consist of salt solutions (3 oz sodium nitrate and 1½ oz sodium acetate to 1 gal water) pumped through a nozzle towards the point of engagement between tool tip and wheel, and recycled through a sump. A rectifier system or a motor generator may be used for the current supply. (18 claims, 2 illustr). Ref cited : 14 USP ; 5 periodicals.

*J* *C 12.9*

**USP 2,827,595** **M. Bruma, M. Magat, Centre National de la Recherche Scientifique** (Dec 21, 1953—conv date, France)

**Device for machining, by means of electric sparks, pieces made of electricity conducting materials**

At least two capacitors connected in series are inserted between the source of current and the spark forming system so that there is always one of them opposing the direct flow of a short-circuit current between the source and the spark, preventing the formation of detrimental arcs between electrode and workpiece. This results in better surface finish and quicker machining. (9 claims, 6 illustr). Ref cited : 10 USP ; *Am Machinist* 1952 ; *Mech Engg* 1953. *J* *C 12.9*

## POWDER TECHNOLOGY

**A method to distinguish between aluminum oxide and diamond powder**

R. A. Edge (Capetown Univ). *Grinding & Finishing* 1958 Vol 4 (1) p 47 (May)

Two milligrams of 10% sodium hydroxide solution are added to a few milligrams of the powder being tested. After 5 minutes the excess sodium hydroxide solution is decanted off and a drop of 0.1% aqueous alizarin—S solution is added to the powder. A violet colour is produced. Thirty per cent acetic acid solution is then added in drops until the violet colour disappears. If the powder is aluminium oxide, a red precipitate will form. Diamond powder will not react with the reagents used. *W* *C 2.3*

**Particle size and lattice deformation of tungsten and tungsten carbide powders**

H. Hendus & coll. *Zeits Metallkunde* 1957 Vol 48 pp 615-624 ; *Chem Abstr* 1958 Vol 52 (7) col 5247 (Apr 10) (Original in German)

Grinding experiments and particle size determinations were unable to explain the difference in hardness of tungsten carbides made from powders prepared in different ways. *W* *C 2.5*

**Nomographs for particle size analysis by sedimentation and permeability methods**

G. D. Joglekar, B. R. Marathe (Nat Phys Lab, New Delhi). *Journ Sci & Ind Res* (India) 1958 Vol 17B (6) pp 232-235 (June)

The two methods described are based on Stokes' law and the air permeability method developed by F. M. Lea and R. W. Nurse. 2 illustr.

*W* *D 7.5*

**The effect of diamond dust alone and mixed with quartz on the lungs of rats**

E. J. King & coll. *Brit Journ Ind Med* 1958 Vol 15 pp 92-95 ; *IMM Abstr* 1958 Vol 8 (5) pp 299-300 (June-July)

Diamond dust (100 mg ; 99% − 2μ) caused no fibrosis in rats' lungs in 400 days when introduced by the intratracheal injection technique. Small amounts of quartz (2 and 5 mg ; 95% − 2μ) produced only a few scattered lesions of grades 1 and 2 fibrosis. Diamond dust (100 mg) combined with quartz (2 and 5 mg) produced many more lesions which were somewhat more fibrosed (grade 2 and 2 max and 3). The results are discussed in their possible relation to coal miners' pneumoconiosis. *X* *C 2.3*

## DIAMOND TOOL PRODUCTION AND DIAMOND RECOVERY

**How Buick saves diamond dust**

M. Patterson. *Grinding & Finishing* 1958 Vol 4 (4) pp 30-31 (Aug)

Savings in diamond dust at the Buick works by installing Torit dust collectors have been as much as 50.5 ct from 14 oz of diamond grinding wheel swarf. An average of 24.9% of the carats contained in a diamond grinding wheel is recovered. 3 illustr.

*W* *D 7.6*

**Is our future with cemented [sintered] diamond cutting tools ?**

C. B. Slawson, R. M. Denning (Michigan Univ). *Carbide Engg* 1958 Vol 10 (7) pp 13-15 (July)

The future possibilities in the development of diamond tool manufacture are discussed, in which man-made diamonds would be used for sintering. The chief difficulty in sintering diamond would be the inversion rate which would prevent the use of the very high temperatures used for the sintering of tungsten carbide ; and the chief disadvantage would be that no control over the direction of the hardness vectors of the powdered diamond would be possible. These difficulties could be overcome, and it is claimed that they would be outweighed by an advantage over single diamond tools, in that the most frequent cause of diamond tool failure, cleavage, would be eliminated. 17 ref.

*A* *D 13.5*

**The recovery of diamonds from prospection samples**

R. G. Weavind, A. A. Linari-Linholm (Diamond Res Lab, Johannesburg). *SA Inst Min & Met Journ* 1958 Vol 58 (12) pp 635-642 (July)

A method of analysing prospection samples so that diamonds weighing only 1/400th carat would not be missed, even in a sample weighing 50 lb, was looked for. The three methods employed to reduce samples to a minimum in the laboratory were milling, electrostatic separation, and heavy liquid separation, although they are not used in that order, nor are they all used on each sample. A highly quartzite sample responds well to separation in bromoform, while others consisting of heavy minerals are easily separable electrostatically ; those of large quantities of soft minerals, such as laterite, limonite, etc, break down readily in attrition milling. Electrostatic separation is more versatile and therefore preferable to magnetic separation, and fusion in caustic soda is not used because it makes it necessary to search for minerals such as garnet in the residue.

Diamonds called 'tracers' are put into the samples after careful noting of their weight and peculiarities of shape so that some indication of the accuracy of the method is given by the number of tracers found by the sorters. Sizes of mills and the grinding media are described. The use of tracer diamonds in milling also shows if diamonds are being broken in the process.

Electrostatic separation is used on samples which weigh more than 1.0 kg, from a $-6$ $+20$ mesh, after milling. Samples of lower weight are separated by the heavy liquid method, in which bromoform is used to separate quartz or other light materials, and a super-saturated solution of lead sulphanate to separate heavy minerals. This solution must be heated to keep it liquid, and is used in a special apparatus equipped with observation windows and an oven for reheating the liquid when it passes from the separating funnel. The exact method of separation and the composition of the liquid are described.

When ready for hand-sorting, the quantity of the sample has been reduced to about 2 kg from 20 kg. Sorting takes place against a dark background, and with the use of 6.5 power wide field binocular microscope. 5 illustr. *A* *C 1.3*

## SURFACE FINISH TESTING

**Roughness standards to-day.** Der heutige Stand der Rauheitsnormung

E. Bickel. *Microtecnic* 1958 Vol 12 (2) pp 41-50 (Apr) (In English)

A survey of roughness standards and testing methods. 11 illustr. *W* *D 15.4*

# TRADE LITERATURE

**Diamond Wheel Catalog No 157**

The Paul L. Kuzmick Co, 271-279 Grove Ave, Verona, NJ. 28 pp, 8½ × 11 in., illustr

Wheels with resinoid, metal, and vitrified bonds are produced by the Company, and a wide selection is described and illustrated in the catalogue. The Ace of Diamonds grinding wheels for dry grinding utilize a special type of abrasive core developed for dry grinding work. The manufacturers recommend fine mesh silicon carbide sticks for the dressing process.

*W* *D 8.0*

**Diamond industrial grinding tools**

Sample Marshall Labs Inc, 63 Park Ave, Lyndhurst, NJ. 12 pp, 8½ × 11 in., illustr

The Marshall catalogues are principally concerned with diamond wheels. Of special interest is a helixing wheel available in sizes between 2½ and 6 inches. Life of the wheel is reported to be good, despite its very thin section ; it is made in both 220 and 320 mesh sizes. Slotting, cut-off, and cup wheels are available, as well as diamond countersinks and core drills, files, hones, reamers, and the Flexolap lapping tool.

The Company also manufactures diamond-plated foil for special cutting needs. Seven mesh sizes from 60 to 400 are produced, and the foil is made in 6 in. squares.

*W* *C 5.2 : D 8.2*

**Markings for identifying grinding wheels and other abrasives : American Standard ASA B5.17-1958**

American Society of Mechanical Engineers, 29 West 39th St, New York 18, NY. 1958, 8 pp, illustr

The standard establishes a symbol for each of the most essential characteristics of grinding wheels and other bonded abrasives ; it does not apply to diamond grinding wheels or special tools, *eg* sharpening stones.

*W* *D 14.1*

**Cincinnati surface grinding wheels**

Cincinnati Milling Products Div, Cincinnati 9, Ohio. 8 pp, 8½ × 11 in., illustr

The catalogue is of a somewhat general nature, dealing principally with the types of operation for which various wheels are suitable. Good use is made of photographs in depicting the operations. Recommendations on choosing the wheel for an operation are given in tabular form. *W* *C 5.3*

**Cortland grinding wheels for cylindrical and centerless grinding**

Cortland Grinding Wheels Corp, Chester, Mass. 8 pp, 8½ × 11 in., illustr

Oxaluma and Carbora proprietary grinding wheels are described, and grinding recommendations are made. The wheels can be used on a wide variety of metals.

*W* *C 5.3*

**Grinding cemented [sintered] carbides with 'Green Grit' and diamond wheels**

The Carborundum Co, Niagara Falls, New York. 20 pp, 8½ × 11 in., illustr

This is an excellent catalogue which should help to resolve the 'silicon carbide or diamond?' question that faces all toolrooms dealing with the grinding of sintered carbides. The information provided includes a brief description of the cutting properties of the two abrasives, and outlines the advantages and disadvantages of each. Standard and special wheel shapes are shown in section, and a standard marking system chart for diamond products is reproduced. Short but useful sections are devoted to wet *v* dry grinding, coolants, and methods of applying grinding fluids.

The types of grinding machine in common use are described, and suitable wheel recommendations are given. The types of grinding dealt with are single point tool grinding, chipbreaker grinding, traverse grinding, plunge grinding, precision machine grinding, and form grinding. Advice is given on the production of good finishes and edges. The dressing, cleaning, and truing of diamond grinding wheels is given a terse but thorough treatment, and a very short section deals with the dressing of silicon carbide wheels. Sound comment is made on feeds, speeds, and safety, and the mounting of wheels is treated at length. Brief mention is made of electrolytically assisted diamond grinding and ultrasonic grinding. The catalogue concludes with seven grinding hints and tables showing the types of operation for which a wheel is suited.

The catalogue is available from the Carborundum Co, at the address shown at the top of this review.

*W* *C 5.3 : C 12.2*

**Diacraft diamond wheels and hones resinoid bonded, metal bonded**

Diacraft Inc, 26538 W Seven Mile Rd, Detroit 40, Mich. 24 pp, 8½ × 11 in., illustr

Diacraft wheels are made in all the customary shapes and sizes for carbide grinding, and custom-made wheels are produced for special applications. They incorporate a new metallic bonding process which is said to yield maximum electrolytic grinding action, uniformity throughout the life of the wheel, and to give an excellent surface finish. Diacraft metal-bonded diamond wheels have also been developed for use on glass, quartz, ceramics, refractories, and other hard non-metallic materials. Diacraft resinoid-bonded wheels exhibit free-cutting properties as a result of close grading of the mesh sizes, and are claimed to be long lasting because of their heat-resisting qualities.

*W* *D 8.21 : D 8.22*

**Precise rotary tools for production and modern toolrooms**

Precise Products Corp, Racine, Wisc. 46 pp, 8½ × 11 in., illustr

Tools of high-speed steel, Tantung, carbide, a variety of other abrasives, and diamond are listed and illustrated. The Precise range of diamond tools includes carbide-bonded diamond wheels, and diamond micro-mandrels with diamond section diameters from 0.024 to 0.275 inch. Diamond saws are produced in eight sizes from ⅛ to 3 in., and diamond slitting saws suitable for cutting sapphire for jewel bearings are made in thicknesses of 0.012 and 0.025 in., with a diameter of 4¼ inches. Precise diamond compounds are available in mesh sizes from 230 to 50,000, with colour identification. A syringe-type gun is available for applying the compounds. Diamond hones and diamond scribers are further examples of the diamond tools covered by the catalogue.

*W* *C 5.23 : C 12.0 : C 13.2*

**Spannerit head**

Triefus Industries Ltd, Manor Royal, Crawley, Sussex. 1 p, 5 × 8 in., illustr

The Spannerit indexing head truing device is available with a straight shank, or with a short stud for mounting in a cranked holder. A Spannerit stud with a cranked holder ensures that the diamond point is at an angle to, and in line with, the axis of the shank. When the head is indexed, the cutting edge is automatically brought into a position exactly parallel to the wheel face, thus enabling the diamond to cut cleanly. The components can be purchased separately or together, and a re-setting service is operated by the manufacturers.

*W* *C 5.21*

**Introducing the new Wendt-Sonis Co Econogrind**

Wendt-Sonis Co, Hannibal, Miss. 4 pp, 8½ × 11 in., illustr

The Econogrind is a conversion unit which permits electrolytically-assisted diamond grinding to be carried out on a conventional grinder. The work or grinder table should be insulated from the diamond wheel, and diamond protrusion on the wheel should not be greater than 0.0003 to 0.0005 inches. The surface finish obtained with a 120 mesh diamond wheel varies between 2 and 10, with an average of 7, micro-in. rms. Finer mesh wheels offer little or no advantage.

In one of the case studies cited, use of the Econogrinder extended diamond wheel life from 144 to 1,360 hr, with a 10%/hr increase in production efficiency.

*W* *C 12.9*

**Dust and fume control with Dustube collectors**

Wheelabrator Corp, 862 S Byrkit St, Mishawaka, Indiana. 8 × 10¾ in. 8 pp, illustr

A number of large collectors are described. Collecting efficiencies above 99% are maintained, regardless of particle size. *W* *C 12.4*

**Wickes grinding wheel salvaging machine**

Wickes Machine Tool Div, Saginaw, Mich. 4 pp, 8¼ × 11½ in., illustr

Intended principally for use where a large number of grinding wheels are used, this machine resizes all types of used grinding wheels, and sizes new wheels to specific requirements. Standard conical type truers are used for crushing the wheel bond.

*W* *D 7.6*

**Elgin's new diamond abrasive DYMO-C finishes carbide dies up to 20% faster**

Elgin Nat Watch Co, Elgin, Ill. 4 pp, 8½ × 11 in., illustr

A brief introductory pamphlet describes a new lapping compound, Dymo-C, for which uniform particle size and uniform dispersion are claimed. It is stated that a 20% efficiency increase over diamond-oil suspensions is attainable. All diamond powder used in Dymo-C is graded under laboratory conditions, and the product is guaranteed to US Nat Bur of Standards specifications. The abrasive is supplied in colour-identified 5 g jars, in mesh sizes ranging from 100 to 14,000. *W* *D 7.0*

**New Harig Grind-All radius dressing arm**

Harig Mfg Corp, 5757 W Howard St, Chicago 31, Ill. 2 pp, 8½ × 11 in., illustr

An attachment is now available for converting the Grind-All into a radius truing device. An accurately mounted diamond truer forms convex radii up to 2 in. diameter, and concave radii up to 4 in. diameter. It is suitable for use on wheels up to 10 in. diameter.

*W* *C 5.21*

# PATENT LISTS

## BRITISH

*The Official Journal (Patents) 1958 (3625) (Aug 7)*

802,297 KLINGSPOR, C. Grinding disks.

*The Official Journal (Patents) 1958 (3628) (Aug 27)*

803,143 SIELEMANN, H. Grinding machine.

803,449 BRITISH THOMSON-HOUSTON CO LTD. Profiling head and stylus mounting for profile and contour machinery.

## UNITED STATES

*Official Gazette 1958 Vol 732 (1-5) (July)*

2,840,952 L. D. SOUBIER, OWENS-ILLINOIS GLASS CO. Glass tube scoring device.

2,840,956 C. M. GRIMAGE, BULLARD CO. Grinding machine.

2,840,957 W. J. WARDEN, H. P. WASSHAUSEN. Lapping device.

2,840,960 S. M. BOOTH. Liquid feed for grinding wheel.

2,841,003 J. H. BREMS, J. B. BIDWELL, GENERAL MOTORS CORP. Surface smoothness measuring means.

2,841,220 E. LARDENOIS. Cutting machine for hard or hardened metals.

2,841,366 J. C. DUNN. Method and apparatus for drilling wells.

2,841,928 D. A. TRESCOTT, SUPER-CUT INC. Truing device for peripheral type grinding wheels.

2,841,929 C. STELMACHOWSKI, SUPER-CUT INC. Truing device for peripheral type grinding wheels.

2,842,342 D. W. HAGLUND, SANDVIKENS JERNVERKS AB. Rock drill cutting insert of hard metal.

2,842,343 W. L. CHURCH, C. E. CHURCH. Retractable bit.

2,842,351 J. A. RODDER. Quartz fibre torsion ultramicrobalance.

2,842,844 H. R. SEAL. Dental polishing disk.

2,842,902 T. J. MILLER, E. L. BOTHIER, MINNESOTA MINING & MANUFACTURING CO. Non-rigid rotating abrasive structures.

2,842,906 L. E. CARTER, R. D. RYAN. Work holder for lapping machine.

2,842,908 H. V. ALLISON, AMERICAN CHAIN & CABLE CO INC. Abrasive cutting wheel mounting and guard.

2,842,960 H. SCHNADT. Testing instruments with means for centring test bodies.

2,843,542 G. F. CALLAHAN. Method and apparatus for producing improved abrading contours.

2,843,977 A. H. KUHNS, FARREL-BIRMINGHAM CO INC. Machine for grinding double helical gears.

2,843,978 H. J. W. HUCKSTEP, J. H. BURNESS, D. NAPIER & SON LTD. Apparatus for use in machining parts to a predetermined surface contour.

2,844,137 A. RICKENMANN, REISHAUER-WERKZEUGE AG. Mechanism for generating the helical thread on grinding worms for gear grinding machines.

2,844,358 C. B. EBERMAN, B. E. R. LOFQVIST, SANDVIKENS JERNVERKS AB. Percussion rock drills.

2,844,706 A. LORENZ, ENGELHARD INDUSTRIES INC. Method of producing minute perforations in solid bodies by thermal impact exerted by concentrated corpuscular rays.

2,844,957 L. SMALL, SERVICE DIAMOND TOOL. Motorized hardness tester.

2,845,520 M. BRUMA, CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE. Machining systems making use of intermittent electrical discharges.

## SOUTH AFRICAN

*Official Journal 1958 Vol 11 (26-29) (July)*

1930/57 R. BLAIR, BOART and HARD METAL PRODUCTS (SOUTH AFRICA) LTD. Boring holes in earth.

## AUSTRALIAN

*Official Journal 1958 Vol 28 (20-24) (June-July)*

214,953 UNION CARBIDE & CARBON CORP. Arc working process and apparatus.

215,470 NORTON CO. Coated abrasive wheel manufacture.

## SWISS

*Patentliste 1958 (12-13) (June-July)*

330,901 BULOVA WATCH CO INC. Bearing for a movement of a horological piece in a measuring apparatus.

331,311 O. M. KROGSGAARD. Hood for grinding or fettling wheels.

331,351 R. EMEIS, SIEMENS-SCHUCKERTWERKE AG. Method and device for making a rod-like body of crystalline material, in particular semiconductor material.

## FRENCH

*Bulletin Officiel 1958 Vol 75 (3872-75) (July-Aug)*

1,166,221 HAHN & KOLB WERKZEUGMASCHINEN & WERKZEUGE. Machine for grinding by immersion.

1,166,460 CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE. Method and device of the kind used in machining workpieces by intermittent electrical discharges.

1,166,795 ETS NEYRPIC (ATELIERS NEYRET-BEYLIER & PICCARD-PICTET ET CROS). Drilling turbine.

1,166,841 J. DESPLAND. Method and machine for working surfaces of metal strips.

1,167,166 STORA KOPPARBERGS BERGSLAGS AB Sintered hard alloy.

1,167,181 W. GRISEL & CO. Device for orientating horological stones in the same direction.

1,167,232 T. REIFENHAUSER. Circular saw.

1,167,320 BIRMINGHAM SMALL ARMS CO LTD. Method of spark machining.

## GERMAN

*Patentblatt 1958 Vol 78 (29-33) (July-Aug)*

**Applications Open to Public Inspection**

1,034,368 W. WAGNER, FIRTH STERLING INC. Sintered hard metal alloy containing chromium carbide, and method for manufacturing articles from such a hard metal alloy.

1,034,396 W. HEINZ, GEBRUDER HAAKE KG. Plastometer.

1,034,505 H. DECKEL, F. W. DECKEL. Machine tool for working, *eg* for grinding, cylindrical and conical bores of, in particular, stationary workpieces.

1,034,506 E.-A. NOLTENIUS. Grinding wheel drive with a friction wheel to be pressed against the grinding wheel for maintaining uniformity of the peripheral speed of the grinding wheel.

1,034,507 N. W. THIBAULT, G. E. COMSTOCK, DEUTSCHE NORTON-GESELLSCHAFT mbH. Grinding wheel for electrolytic grinding.

1,034,537 H. NEUENBURG. Milling cutter for milling grooves in walls.

1,034,786 K. H. STEIGERWALD, CARL ZEISS. Method for making spinning nozzles.

1,034,951 GLEASON WORKS. Bevel gear grinding machine working by the generating method for producing gears with corrected profiles.

1,035,512 G. SELTER. Spindle support for plunge cut grinding machines with vertical grinding wheel and work spindles.

1,035,782 H. F. A. TE GUDE, PHILIPS PATENT-VERWALTUNGS GmbH. Method for attaching semiconductor devices to a good heat conductor carrier.

1,035,888 H. EBELING. Combined turning and drilling machine for buttons and similar mass produced articles.

1,035,921 F. BERGTOLD, TELEFUNKEN GmbH. Device for changing the rotary speed and automatically and simultaneously changing the gramophone needle for another one adapted to the new speed.

1,035,922 H. BERNER, ELECTROACUSTIC GmbH. Device for releasably connecting a tone-arm and a needle member.

1,036,093 P. KUHN, GUENTHER & CO. Device for preventing the formation of a mist at liquid cooled grinding wheels.

1,036,696 H. SCHWABE, VEB CARL ZEISS. Device for making toric surfaces.

1,036,697 E. ROTZOLL, K.-O. SCHMIDT, HERMINGHAUSEN-WERKE GmbH. Device for preventing the grinding of undesired small faces on workpieces tilting from the work support of centreless grinders for continuous grinding.

1,036,700 H. WALKLING, SCHUMAG SCHUMACHER METALLWERKE GmbH. Device for maintaining the cutting speed of grinding wheels.

1,036,766 P. TUETEV, FABRIQUES D'ASSORTIMENTS REUNIES. Clamping arrangement for the lever stone in the lever disk of an anchor escapement.

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## THE FOLLOWING REPRINTS ARE NOW OUT OF STOCK AND UNAVAILABLE

I 36—Optical methods for the examination of surfaces, by B. Frischmuth (*IDR*, 1946).
I 38—Diamond abrasive sawing disks, by W. Stern (*IDR*, 1946).
I 52—Third symposium on diamonds, with contributions by E. H. Kraus, W. B. Emerson, etc (*Am Mineralogist/IDR*, 1946).
I 58—Investigations of the lapping process, by F. Eugene (*IDR*, 1947).
C 3—Diamond tools for plastics (*Plastics*, 1944).
C 5—Machining of light alloys with diamond tools (*Light Metals*, 1944).
C 7—Cutting tool nomenclature, by P. Grodzinski (*Machinery*, 1944).
C 8—Machining of copper, by P. Grodzinski (*Metal Industry*, 1944).
C 12—Machining brass, by W. Stern (*Metal Industry*, 1945).
C 16—Selection of industrial diamonds, by P. Grodzinski (*Mining Journal*, 1946).
C 25—The industrial diamond, by W. Stern (*S. African Engineering*, 1947).
C 38—Die technischen Fortschritte bei Diamantwerkzeugen in den letzten 5 Jahren (Technical developments with diamond tools during the last five years), by P. Grodzinski (*Feinwerktechnik*, 1950. In German).
C 86—A gear drive for a simple polariscope, by P. Grodzinski (*Lab Practice*, 1955).
D 13—Trade Names Index (*IDR*, 1945).
D 14—Glossary of technical terms, by W. J. Sansom (*IDR*, 1945).

This list includes those out-of-stock reprints already mentioned on p 8 of our current Reprint List.

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# LIST OF PUBLICATIONS, OCTOBER, 1958

***INDUSTRIAL DIAMOND ABSTRACTS:** issued monthly, from 1944 onwards, about 20 pp, 7⅞ x 9¾ in. Surveys technical, scientific, and patent literature.

***LIST OF PERIODICALS—BIBLIOGRAPHY OF INDUSTRIAL DIAMOND APPLICATIONS:** Alphabetical, 8 pp, 7⅞ x 9¾ in., Sep 1955.

***LIST OF PERIODICALS IN THE INDUSTRIAL DIAMOND INFORMATION BUREAU LIBRARY AT MAY 31, 1958:** Alphabetical, 8 pp, 7⅞ x 9½ in. A list of periodicals available for loan from the Industrial Diamond Information Bureau Library. This does not replace *List of Periodicals* (above), which is a list of periodicals abstracted in *Industrial Diamond Abstracts*, many of which are not held by the Library.

***IDR REPRINT SERVICE :** Classified, authors' index, subject index of groups, 12 pp, 7⅞ x 9¾ in., Sep 1958. (Reprints 1s each, post free).

***THE DIAMOND RESEARCH LABORATORY:** 16 pp, illustr, 11 x 9 in. Rev ed, 1956.

**SELECTED BIBLIOGRAPHIES:**

* **Truing of grinding wheels** (from 1910 to 1951). 39 pp, 7⅞ x 9¾ in. 3rd rev ed, Feb 1952.

* **Diamond as cutting tool for metals and non-metallic materials.** 24 pp, 7⅞ x 9¾ in. 2nd rev ed, Nov 1950. Name index, 1951.

**Hardness and hardness testing** (from 1937 to 1955). 118 pp, name index, subject index, 7⅞ x 9¾ in. 1955-56. Price 5s 6d.

**DIAMOND TOOL PATENTS** (Patent Monographs)

**IA: Machining metals and non-metallic substances,** by P. Grodzinski, W. Jacobsohn. 2nd rev ed, 55 pp, 7⅞ x 9¾ in. Apr 1949. Price 10s.

**II, IIs: Diamond abrasive wheels,** by P. Grodzinski. 74 pp, 4 tables, name index, 7⅞ x 9¾ in. Aug 1948/49. Price 13s 6d.

**III, IIIs: Truing of grinding wheels,** by W. Jacobsohn. 133 pp, 82 illustr, name index, 7⅞ x 9¾ in. Dec 1948/49. Price £1.

**IV: Polishing of gem diamonds,** by W. Jacobsohn. 40 pp, 83 illustr, 1 table, name index, 7⅞ x 9¾ in. December, 1950. Price 12s 6d.

**IA to IIIs** available as compilation in Spirollo binding, price £2 9s.

**THE PRINCIPLES AND DESIGN OF A NUCLEAR RADIATION COUNTER WHICH USES A DIAMOND AS ITS DETECTOR,** by W. F. Cotty. 18 pp, illustr, 7⅞ x 9¾ in. Oct 1956. Price 2s 6d.

**DATA SHEETS FOR THE DIAMOND TOOL DESIGNER AND MAKER**—Definition and designation of angles: Comparison of names for tool angles: Plane of chip flow: Clearance and rake angles: Minimum clearance for diamond boring tools: Economic layout of tool tips: Height position of turning tools: Accepted standards. 1945, reprinted Oct 1956. Price 5s.

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* *Publication free of charge.*